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And *The Nation's Health*

Volume 24 December, 1934 Number 12

## Symposium on Poliomyelitis

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American Journal of Public Health
*and* THE NATION'S HEALTH

Volume 24 December, 1934 Number 12

# Previous History of Poliomyelitis in California*

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ACUTE anterior poliomyelitis has occurred in California for many years. Gundrum [1] obtained an accurate account of a case which had developed in Eureka in 1875. This case was in a child aged 2 years with an acute onset "followed in a few days with paralysis in the lower extremities," and the patient stated that another child had developed a similar illness "at about the same time." Gundrum reported further that a careful check of the medical literature failed to reveal any indication of subsequent cases until 1896, although in 1913 he [2] reported that his investigation had been continued and he had obtained data regarding 2 cases near Bodega Bay, Marin County, in 1888.

Sherman [3] in 1897 stated:

> It is now over 12 years since I treated a child for indigestion who had a poliomyelitis, and since that time I have never seen a child in whose case the diagnosis was obscure without examining to see if the child could move all its extremities. I have not yet found my second case, but last summer I got to within 2 weeks of the invasion and sometime, if I live long enough, I will make the diagnosis.

During 1896, 8 cases were brought to his attention—7 in San Francisco and 1 in Napa.

Two years later, 1899, Newmark [4] published his observations: "A Little Epidemic of Poliomyelitis," presenting 4 cases which had occurred in 1898 in Merced County. Three of the cases were in the town of La Grande having only 49 inhabitants, and the 4th was in the outlying district about 3 miles from town. Sawyer [5] in commenting on the incidence of poliomyelitis in Humboldt County mentioned 1 case at Field's Landing during 1898.

Woods [6] reported:

> During this year (1901) the infection that causes acute anterior poliomyelitis was very lively in this state, it being most active, however, during the months of May and June. The little victims are to be found among all classes, the entire length of the state; at the seaboard towns, as well as in the interior; in the mountain districts, and again from the valleys. By far, the greater proportion was in San Francisco and its immediate vicinity.

Detailed histories of 25 cases were given and reference was made to 30 additional

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

cases in children. The author referred also to several children stricken in San Francisco in 1902. Brown [7] reported cases in Watsonville and vicinity, Santa Cruz County in 1907, and in Redding and Red Bluff in the northern part of the state during 1909. Sawyer [5] mentioned 1 case at Samoa, Humboldt County, in 1908.

No additional references to case reports for California prior to 1910, have been found. The morbidity and mortality records for that period as published by the California State Board of Health did not include any reference to the incidence even for the years during which poliomyelitis was known to have occurred, and it was not until 1912 that the term "acute anterior poliomyelitis" was listed as a cause of death. However the U. S. Bureau of the Census first tabulated acute poliomyelitis deaths separately in 1909. Lavinder, Freeman and Frost [8] in their tabulation of reported deaths and cases for the United States by states credited California with 12 deaths from this infection in 1909 and referred to 67 cases reported by Fleischner.

We are indebted to Dr. F. F. Gundrum of Sacramento for detailed accounts of the prevalence of this disease throughout California during 1910, 1911, and 1912.[1, 2, 9] The State Board of Health [10] in 1910 detailed him to conduct an official investigation throughout the state. During the same year, the San Francisco County Medical Society appointed a committee for the study of "anterior poliomyelitis" in San Francisco. The report of this committee was compiled and submitted by Fleischner.[11]

It is interesting to note that all of the above references pertain to cases occurring north of Tehachapi. With the exception of Woods's [6] statement that cases occurred over full length of the state, one would infer that no outbreak had been observed in Southern California prior to 1912 when Orbison [12] presented a report on epidemic poliomyelitis in Los Angeles. He stated that during the week ending June 15, 1 case was reported to the health officer, and during the following 4 weeks 77 cases were recorded. Then at the request of the City Health Commissioner a meeting of "physicians, clergymen, laymen, and women" was called on July 19 and as a result a committee was appointed to serve as an advisory board with the Health Commissioner. For the period June 15 to August 27, 1912, 239 cases were officially reported.

The incidence of poliomyelitis in California from 1909 to date as assembled by the State Department of Public Health is shown in Table I.

TABLE I

| *Year* | *Cases* | *Deaths* |
|---|---|---|
| 1909 | 67 | 12 |
| 1910 | 139 | 29 |
| 1911 | 55 | 13 |
| 1912 | 531 | 129 |
| 1913 | 90 | 33 |
| 1914 | 56 | 27 |
| 1915 | 62 | 19 |
| 1916 | 145 | 24 |
| 1917 | 67 | 26 |
| 1918 | 69 | 20 |
| 1919 | 27 | 9 |
| 1920 | 75 | 30 |
| 1921 | 283 | 49 |
| 1922 | 62 | 24 |
| 1923 | 251 | 33 |
| 1924 | 192 | 34 |
| 1925 | 821 | 144 |
| 1926 | 187 | 30 |
| 1927 | 1,298 | 224 |
| 1928 | 303 | 80 |
| 1929 | 171 | 46 |
| 1930 | 1,903 | 157 |
| 1931 | 293 | 48 |
| 1932 | 191 | 31 |
| 1933 | 170 | 14 |
| 1934 (to Aug. 18th) | 2,648 | 64 (Jan. through July) |

We may say that during this period there have been 5 extensive epidemics (see Table II).

TABLE II

| | *Reported Cases* | *Deaths* |
|---|---|---|
| 1912..... | 531 | 129 |
| 1925..... | 821 | 144 |
| 1927..... | 1,298 | 224 |
| 1930..... | 1,903 | 157 |
| 1934 (to Aug. 18).. | 2,648 | 64 (through July) |

There was a lapse of 13 years between the first and second epidemics and the last 4 have taken place during the past 9 years at 2, 3, and 4 year intervals. Certainly no regularity of epidemic cycles is apparent.

It is difficult to compare the types of infection in the different epidemics. The basis of diagnosis has varied and also the definition of reportable cases has changed. However, the death rates have confirmed our observation that the 1912 and the 1927 outbreaks were the most severe. The consensus of opinion from the data available at present is that the cases have been mild this year even though the total number of cases greatly exceeds those of any previous year.

In plotting the incidence for each year by months, the peak has usually fallen within the months of July to October; however, in 1896, 1901, and 1934, the highest incidence appeared in June. The records for 1896 are not representative of the state as a whole because only those cases reported by San Francisco physicians are available. In 1901 Woods [6] referred to a state-wide epidemic and stated that poliomyelitis was most active during the months of May and June. At no time since 1901, even in any one population center, has the highest incidence appeared as early as May and June until 1934. Observations on the seasonal incidence of poliomyelitis in California to date, indicate conclusively that a consistent increase during March and April is the forerunner of a summer epidemic.

Regarding age distribution, the available data present evidence of a definite shifting of the incidence of this disease in California to the older age groups. Once again the definition of what constitutes a reportable case may be a factor. With better diagnosis more cases among adolescents and adults may be detected. Even assuming that these factors may have played a part in this shifting of age distribution, the fact remains that the percentage of cases among young children has so definitely decreased in favor of the older groups that we feel this trend, observed by Forsbeck and Luther of Massachusetts, Knowlton of Connecticut, and Frost and Das and others,[13] applies to California also. Gundrum [2] reported that during 1910–1912, 363, or 72 per cent of the 706 recorded cases, were under 8 years of age. During 1932–1934, 1,253, or 46 per cent of the 2,697 reported cases, were under 10 years of age. An analysis of the 5 epidemics (see Table III) shows the age distribution.

TABLE III

| *Year* | *Cases Under 10 Years of Age* | *Per Cent* | *Cases Over 10 Years of Age* | *Per Cent* | *Total* * |
|---|---|---|---|---|---|
| 1912..... | 277 † | 78.0 | 254 | 22.0 | 531 |
| 1925..... | 533 | 65.7 | 279 | 34.3 | 812 |
| 1927..... | 803 | 62.9 | 475 | 37.1 | 1,278 |
| 1930..... | 1,112 | 59.4 | 764 | 40.6 | 1,876 |
| 1934..... (to Aug. 1st) | 1,034 | 44.1 | 1,309 | 55.9 | 2,343 |

* Total number of cases with ages specified
† Only available data state cases under 8 years of age instead of under 10 years

During each of these epidemic years there has been a consistent decrease from 78 per cent under 8 years to 44 per cent under 10 years. A more detailed analysis of this shift will be published when all of the data for 1934 have been compiled.

SUMMARY

1. Poliomyelitis is known to have occurred in California since 1875.

2. No data are available to indicate that this infection appeared in Southern California in epidemic form prior to 1912.

3. Records of 5 epidemics, 1912, 1925, 1927, 1930, and 1934, indicate that the June peak in 1934 is unusual.

4. There has been a consistent shifting of the age incidence to the older groups—in 1912, 78 per cent of the cases were under 8 years of age; in 1934, only 44 per cent were under 10 years of age.

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# Measuring Health

. . . Further, it is contended that, in any case, the study of sickness and mortality, and reports thereon, does not represent ***health*** but disease.

On this last point, which is a cardinal one, it may be said at once that the only way in which it is possible to measure the health of a people, currently and concretely, year by year, is to gauge its degree by recording any departure from health as represented in sickness, incapacity or mortality. For the health of the individual is a physiological balance, an imponderable, subjective and objective, and the disturbance of its happy equipoise is the only indication of ill-health. If that ill-health be smaller or greater, or if our days be curtailed or prolonged, we can deduce a standard of health. It may be a variable deduction, or even an "unscientific" one—that is inexact and relative only—but there is no alternative method to measure a nation's health apart from a complete periodic assize of the physique of the individuals composing the population—an impossible and fantastic task. Hence we must content ourselves with estimating our own health, or that of the nation by the evidence of the absence or presence, of dis-ease, incapacity or death. . . .

—Extract from the *Annual Report of the Chief Medical Officer of the Ministry of Health for the Year 1933*, p. 252.

# Poliomyelitis, 1934*

J. L. POMEROY, M.D., F.A.P.H.A., AND
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SINCE the first of this year poliomyelitis incidence has been above seasonal expectancy, by May 1 there having been 61 cases as against 20 for the corresponding period in 1933. We had been calling attention to this increase and the necessity for early diagnosis and isolation in our weekly bulletin, the *Health Index*. We also announced to the profession the fact that we maintained a limited supply of convalescent poliomyelitis serum, and the necessity of the early administration if results were to be expected. As poliomyelitis has been appearing in California in waves about every 4 years since 1912, the last wave or epidemic having been in 1930, we were apprehensive that the disease was running true to form and that we were facing another epidemic.

The County Health Officer early in May called a meeting with our 12 District Health Officers, and ways and means of combating an epidemic were discussed. The County Health Officer at that time declared his intention of bringing into being a Poliomyelitis Advisory Board whose duties would be to advise with him and determine policies and control measures in a broad way. Accordingly a letter was addressed to a group of the leading physicians of the Los Angeles County Medical Association, who responded to the call, and the organization was effected on May 14, 1934, with the Chairman of Public Relations Committee of the Los Angeles County Medical Association as President and the Chief of Staff of the California Babies' Hospital as Secretary. Other members were Chief of Staff of the Communicable Disease Division of the County General Hospital and his assistant, Chief of Neurological Service Children's Hospital, Health Officer of Pasadena, Director of Health Service of Los Angeles City Schools, Chief of Staff of the Orthopedic Hospital, Los Angeles City Health Officer and his Epidemiologist, Los Angeles County Health Officer and his Epidemiologist, Professor of Medicine of University of Southern California, Director of California Department of Public Health and his Senior Epidemiologist.

The following program was decided upon and carried out:

1. Bulletin, *What You Should Know about Poliomyelitis* for the lay public. One hundred thousand of these were distributed through the Parent-Teachers Association and various other agencies.

2. Bulletin to be issued by California State Department of Public Health and distributed to all physicians.

3. Circular letter to physicians of this county on symptoms and necessity for early diagnosis and treatment with pooled convalescent serum, the use of which was recommended by the board.

4. Continuation of schools as in normal years with additional provisions for daily medical inspection of all children and prompt isolation and reporting of all showing symptoms suggestive of poliomyelitis.

5. Continuation of regulated swimming with

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

special supervision and instructions relative to the danger of diving and ducking and otherwise washing the protective coating from the nasal mucosa.

6. Passage of a County Camp Ordinance with special provisions for medical inspection before entrance and daily medical inspection thereafter, also provisions for isolation of suspects.

It is noteworthy that not a single case of poliomyelitis developed in any of the camps so supervised.

A policy of taking the public into our confidence and keeping them properly informed of the exact status of the epidemic was agreed upon and followed to our entire satisfaction throughout the course of the outbreak. This was accomplished through the press and over the radio and seemed to be greatly appreciated by the public in general, as expressed editorially by a number of our metropolitan newspapers and by many private communications.

As the epidemic developed it became mandatory that additional funds be provided for diagnostic service, orthopedic service, and various other necessary functions. This request to our Board of Supervisors met with immediate response, so we were enabled to employ the necessary assistance to complete our program.

The matter of providing convalescent serum was a critical one owing to the sharp rise in incidence during the first weeks of May. The Chief of Staff of the Orthopedic Hospital called in a group of convalescents and provided the blood, and the Los Angeles County Health Department Laboratory prepared the serum, in all about 15 gallons. This afforded the chief supply for the General Hospital (the only contagious disease hospital in this county), and made possible the administration of serum from the beginning of the epidemic.

The necessity for early diagnosis and hospitalization was stressed from the beginning, especially in our more congested areas where economic conditions were poor, as it was felt that such procedure would be productive of the best results. This is particularly true in our Belvedere District where the case rate was 1 to 400 population.

Through our policy of keeping the public informed, parents, instead of becoming panicky, would call their family physician, or a health officer in the event they could not secure a private physician, upon the appearance of first symptoms suggestive of poliomyelitis. Consequently, a large majority of our cases were discovered in the preparalytic stage and fully 90 per cent were hospitalized where serum and proper orthopedic care were administered. Those not hospitalized were provided with serum in the homes.

When cases or suspected cases were reported to our health centers a trained diagnostician responded to the call, made thorough examination, epidemiological investigation, and sent the patient to the hospital when indicated.

A trained nurse or physician checked contacts regularly for secondary cases, and also maintained a specially prepared chart in each quarantined home upon which were recorded all minor illnesses. Before releasing quarantine, an inspection was made by a physician and muscle check was made when the patient was in the home. All convalescent patients were routinely muscle checked at regular intervals after release from quarantine and in a few instances "straggling" cases of paresis were detected that had developed subsequent to release.

Our total incidence for the epidemic was 630 with a case fatality rate of 1½ per cent.

In a careful history check of 370 cases we find the following:

1. Of 235 cases which received serum in the preparalytic stage in dosage from 50 to 100 c.c. on the 1st to 3rd day from onset, 213 or 90 per cent proved on muscle check after re-

lease from the hospital to be normal, while 22, or 10 per cent, showed weakness of certain muscle groups.

2. Of 100 paretic cases muscle checked after release from the hospital, 53 per cent showed no extension, 35 per cent showed complete recovery, and 12 per cent showed extension to other muscle groups but not to the extent of causing physical disability. Under present orthopedic treatment the prognosis is regarded as favorable for complete recovery.

3. Thirty-five were found in the muscle check to come in the paralytic class. Twenty-five of these had received serum very late, that is, from the 5th to 12th day from appearance of paresis. Ten were either missed or refused serum. Our worst cases and the only ones in which we found "Trace or Gone" muscles were in this last group.

In conclusion, we feel that the extremely low case fatality rate and the small percentage of residual paralysis may to a certain extent be credited to three factors: (1) Early diagnosis, (2) early hospitalization and administration of pooled convalescent serum in full dosage, (3) proper orthopedic care while in the hospital and adequate provision for treatment after release.

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# Syracuse, N. Y., Continues Its High Standard of Health

DESPITE the fact that the budget was again cut, Syracuse, N. Y., reports in 1933 the lowest general mortality rate in the city's history, 10.9; and also established a new low rate for infant mortality, 39.6. For the forty-fifth consecutive year, there was no death from smallpox; there were only 6 local cases and no deaths from diphtheria; while the 4 typhoid fever deaths give a rate of less than 2 per 100,000.

With a birth rate of 16.1 a high average of hospitalization was maintained, 80 per cent of all births taking place in hospitals and 98.9 being attended by physicians. The tuberculosis death rate, 37.4, was a slight rise over the previous year.

As the health commissioner points out, only the facts that 1933 was singularly free from any major outbreaks of acute communicable disease and that supplementary personnel were contributed by government relief agencies made it possible for Syracuse to continue its high standard of health achievement.

The organization of prenatal and obstetrical service is of interest. There are 7 prenatal clinic sessions per week in the city, but not established as a separate bureau of the Department of Health. Health Department nurses are assigned to each of the clinic stations, and field supervision of the prenatal cases registered in the clinics is a responsibility of the district nurses' program. Medical supervision in the clinics is provided through the Syracuse University Medical School.

Where confinement is within the home, delivery and post-partum services are rendered through the clinic medical staff and the local Visiting Nurse Association, a stipulated charge for this home service being made to the Department of Public Welfare.

# Epidemiology of Poliomyelitis in California, 1934*

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UP to a year ago there had been no noteworthy increase of poliomyelitis in California since the last outbreak, that of 1930. Late in the fall of 1933 and during the following winter there was an unusual prevalence for that season of the year, presaging the 1934 epidemic. This prevalence was most marked in the counties nearest to Los Angeles County on the east and south; it is usually the southern part of the state which is first affected in epidemic years. As in other localities when poliomyelitis becomes prevalent, the interval from the previous outbreak gives some indication of the intensity to be expected. These intervals had been increasing in California—2 years between 1925 and 1927, 3 years between 1927 and 1930, and 4 years since the last outbreak, in 1930.

Epidemiological studies of the 1934 epidemic were undertaken by the U. S. Public Health Service and the California State Department of Health, with the coöperation of county and city health departments, and are at present being carried on in the 4 centers of high incidence. These 4 centers, in chronological order of the appearance of the epidemic, are: Orange County, adjacent to Los Angeles on the south; Los Angeles County; the Bay region, comprising the counties of San Francisco, Alameda, Contra Costa, Marin, Napa, San Mateo, Santa Clara, Solano, and Sonoma; and Fresno County, which is located in the south-central part of the state in the San Joaquin Valley.

As regards the season of its beginning, maximum, and subsidence, this epidemic has been remarkably early, though not unique in this respect. In the equable climate of the Pacific Coast the seasonal occurrence of poliomyelitis might be expected to be, and is in fact, broader than for the United States as a whole. The curve of average incidence usually begins to rise in May, is high by July in the southern part of the state, but reaches a peak in September, somewhat later and less sharp than that for the entire country. As a basis for judging intensity of prevalence in the United States, except for the Southern States, it is convenient to consider 10 paralytic cases per 100,000 per year as a

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

"normal" rate or average rate of all such cases reported, with 1 case every 2 weeks for a population of that size during the peak of the season. In the largest epidemic in history, that of New York City in 1916, the rate was approximately 20 times this height; in 1931 about 10 times. In 1916, the reported cases were, in general, frankly paralytic. In later years the diagnosis has come to be made more and more without evidence of paralysis. The case fatality, based on reported cases, in the 1916 epidemic was about 24 per cent; in 1931 about 12 per cent.

At the time of writing, Orange County has reported 40 cases, a rate of 35 per 100,000 population, with 1 death. This case rate is only about 3½ times the normal, and the occurrence of 1 death in 40 cases would correspond to a fatality of about 2.5 per cent. Consistent localization of poliomyelitis began in Orange County the second week of April. The peak of the outbreak, by onsets, was in May and early June, and the peak and subsidence have been earlier here than elsewhere in the state.

In Los Angeles city and county, the cases were widely scattered geographically, except for a sharp focus in May in the Ruth Protective Home, an institution for infants, children, and young women, located about 3 miles east of the city limits. The incidence of the disease in proportion to the population was remarkably uniform in the 16 assembly districts into which the city was divided, the heaviest incidence being in the most thinly populated district, the San Fernando Valley, and the next heaviest in two of the most thickly populated districts. One of the most thickly populated sections of the county outside the city, Belvedere, has had the heaviest incidence of the whole metropolitan area. The peak of the Los Angeles epidemic, in terms of onsets, was in the first week of June, and the subsidence since then has been generally consistent, though gradual. The weekly rate was 10 cases per 100,000 at the peak, declining to 2½ cases per 100,000 in the first week of August.

The outbreak in the San Francisco Bay region was sharper and less intense as regards the number of reported cases, than in Southern California. The Bay outbreak had hardly begun in mid-May, when the rate was less than one-tenth of the rate of the Los Angeles area at that time. At the peak, in mid-June, the rate for the Bay had risen to half that of the Los Angeles peak, which occurred 2 weeks earlier. The subsidence of the outbreak was also much more prompt around the Bay, the rate being normal for the season by August 10.

In Fresno, there was not 1 case per week until the middle of June. Since then the incidence in proportion to population has exceeded that in the southern part of the state, the peak by onsets occurring the first of July.

This epidemic has shown peculiarities which have raised questions of interest. One of the most prominent of the latter is that of the occurrence of atypical cases which, in the present paper, are included among the reported cases. Is it correct so to include them? Has there been more than one epidemic disease present? Some of the circumstances of this outbreak may shed light on this question. Mildness has characterized the disease in each of the four foci studied. While it is too early, and the deaths are too few, to emphasize case fatality rates, these have all been remarkably low—6.8 per cent in San Francisco, 2.5 per cent in Orange County, 2.3 per cent in Fresno County, and 1.5 per cent in Los Angeles County. All rates stated for this epidemic are based on all reported cases. However, even if only paralytic cases were considered, the above fatality rates would be remarkably low. Two-thirds of the cases in San Francisco have been

investigated, 63 per cent of these being paralytic. In the Los Angeles area 50 per cent of those investigated were considered paralytic, in Fresno—47 per cent, and in Orange County—57 per cent. Tending also to support the idea that the epidemic as reported is composed of not more than one disease entity is the fact that the atypical cases, relatively mild as regards paralysis, have been reported from various parts of the state roughly in proportion to the occurrence of the frank paralytic poliomyelitis.

Certain peculiarities in age and sex distribution are shown in Table I.

TABLE 1

| Age | Percentage Distribution | | | |
|---|---|---|---|---|
| | *Orange County* | *Los Angeles County* | *San Francisco Bay Communities* | *Fresno County* |
| Under 5 years | 23 | 16 | 12 | 17 |
| 5 to 9 | 28 | 28 | 28 | 24 |
| 10 to 14 | 28 | 19 | 27 | 23 |
| 15 to 19 | 13 | 8 | 12 | 16 |
| Males, 20 and over | 0 | 11 | 9 | 6 |
| Females, 20 and over | 8 | 18 | 12 | 14 |
| Total | 100 | 100 | 100 | 100 |

Although in recent years poliomyelitis has shown less and less selectivity for the youngest age group, the above age distribution, especially as regards adults, is unusual in a population as urban as that involved in this epidemic. In spite of a marked predominance of adults among those whose attacks were atypical, the above age-sex distribution, with relatively high prevalence in adult females as compared with adult males, follows the expected incidence of an infectious disease transmitted by contact with the age group having the more typical cases, namely, the children.

The communicability of the disease in this epidemic was high. This is indicated by its unique incidence among hospital and nursing personnel, discussed elsewhere, and also by the fact that 12.5 per cent of the households so far tabulated with regard to this item, had multiple cases. This is an unusually high multiple case rate for this disease in communities largely urban.

As commonly observed in poliomyelitis, the distribution of the cases as to milk supply and water supply has given no indication that either of these could have been a major factor in the spread of the disease in foci thus far studied. One advantage which we have had in the survey is the investigation of supposedly uninfected households as controls. The comparison with controls did not indicate any special peculiarity of the cases of poliomyelitis regarding milk or water supply. For the Los Angeles area these control studies have also tended to exclude the often suspected swimming pools and beaches as primarily important centers for dissemination of infection; 12 per cent of the poliomyelitis patients and 15 per cent of the controls had indulged in this sport. On the other hand, approximately 8 per cent of the patients remembered unusual physical exertion immediately preceding the attack, while only 2 per cent of the controls gave such a history during a corresponding period immediately before the peak of the epidemic.

All the evidence at hand indicates that the mode of spread in this epidemic is similar to that which is usually accepted for poliomyelitis, namely, by contact with human carriers, and to a much less extent, with recognized cases of the disease.

# 1934 Epidemic of Poliomyelitis in Los Angeles*

## Preliminary Report on the Pathological Changes in the Nervous System

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THE variable clinical manifestations of the cases occurring in this epidemic add to the interest in the changes in the nervous system which accompanied them. The large amount of material gave an excellent opportunity for their study. Fifteen cases came to autopsy in the Los Angeles County General Hospital, 11 of which have been summarized on the accompanying chart. Two cases were not included as complete material was not available. A third was complicated by a large cerebellar hemorrhage. All 3 cases showed extensive perivascular infiltration ("cuffing") of the vessels of the pons and medulla. Two showed no lesions in the spinal cord other than hyperemia. Intense perivascular infiltration of the vessels of the spinal cord was present in the third, not comparable to the slight cell destruction.

Dr. Kessel informs us that material from 5 of the 12 cases was successfully inoculated into monkeys. Two others produced atypical results.

Sections from the spinal cord of the typical cases which have been studied showed lesions similar to those found in the human cases. The lesions in the positive human cases did not differ from those in which the inoculation was unsuccessful. The human lesions in 1 successful animal inoculation were comparatively slight.

The gross appearance of the brain and spinal cord in all cases showed a marked hyperemia of the meninges. The underlying nervous grey and white matter was intensely congested and in several cases cyanotic. Sections showed the same hyperemia. Cross-sections of the spinal cord showed numerous minute hemorrhages in the grey matter.

The microscopic changes were most marked in the medulla, pons, and spinal cord.

The membranes covering these parts showed a variable amount of round cell infiltration. This was most marked around the blood vessels, and though it was usually present at that point, nowhere was it of the degree seen in a moderate meningitis.

The blood vessels throughout the nervous system were distended with red

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

## CHART I

c. — congestion
e. — exudate
d. — degeneration
m. — meningitis

| Patient | Age | Sex | Lumbar | Thoracic | Cervical | Medulla | Pons | Dentate nucleus | Lentiform nucleus | Hippocampus | Frontal lobe | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. W. 11829 | 15 | F. | c. e. d. m. | M.T. | | | | c. e. d. m. | c. e. | c. e. m. | C. m. | Dysphagia Resp. paraly. Pneu. + empyema 1 mo. |
| neg. J. H. 11855 | 28 | M. | c. e. d. m. | MT | | | | c. e. d. m. | | c+p.h. | | Dysphagia Weakness a+1 Resp. paraly. 4 hrs. |
| R. G. 11856 | 24 | M. | c. e. d. m. | | c+hem UT | | | c. e. d. m. | | | | Respirator— died 4 hrs. later. |
| L. C. 11888 | 13 | M. | c. e. d. m. | | | c. e. (pmn) | | | | | | Headache, Stiff neck, dysphagia, Respirator. |
| M. B. A. 11891 | 37 | F. | c. e. d. m. | c.th ? | | c. e. d. m. | | | | | | Died pneumonia, convalescence. |
| C. W. 11893 | 19 | F. | c. e. d. m. | | | c. e. d. m. | | | | ? | | many p.m.n. |
| E. E. 11895 | 27 | F. | c. e. d. m. | | | | | | | | | many p.m.n. |
| N. D. 12019 | 12 | M. | | | | | c.+h | | c.+h | | | many p.m.n. |
| L. C. 12040 | 12 | M. | c. e. d. m. | | | | | | | | | Respirator |
| D. M. 12043 | 14 | F. | c. e. d. m. | | | | | | | | | |
| M. K. 12049 | 8 | F. | c. e. d. m. | | | | | | | | | Partial paralysis both arms |
| D. B. 12058 | 11 | F. | c. e. d. m. | | | | | | | | | Changes slight |

blood cells. This was present equally in the grey and white matter. In the anterior horns of the spinal cord and in the medulla there were occasional minute capillary hemorrhages. The most characteristic change was the infiltration of the blood vessel walls. This varied from a few round cells to a complete ring. In more advanced cases the perivascular spaces and surrounding tissue were packed with cells. All degrees were seen in the same case and in a single section normal vessels were found alongside of those with more or less infiltration.

The more marked degree resembled the cuffing seen in encephalitis. The different levels of the cord showed great variation. Some sections showed every vessel involved, while in others it was limited to the vessels of the anterior fissure and the anterior horns.

Often the two halves of the cord showed different lesions, perivascular change on one side and nerve cell destruction on the other. This infiltration was often present alongside normal cells.

Irregular clumps of cells were found scattered through the grey and white matter of the cerebrum and cerebellum and more frequently in the pons, medulla, and spinal cord. These varied greatly in size and were largest in the medulla and anterior horn. Those in the anterior horn varied in size from the space of a single cell to occupying the whole of the grey matter. They were composed of cells with round nuclei and scanty protoplasm, cells with very irregular nuclei, an occasional polymorphonuclear leucocyte, and rarely a compound granular corpuscle.

In a few instances the polymorphonuclear cells predominated.

These clumps were not related to the perivascular changes, as they occurred independently in various sections.

It is probable that these clumps were partly formed by microglia and glia cells as well as lymphocytes.

The clumps in the medulla were often of large size extending into both grey and white matter.

The changes in the nerve cells were largely limited to the motor cells of the anterior horn of the spinal cord and to the bulbar nuclei.*

The changes may be described as follows: Nissl bodies diffusely staining; Nissl substance clumped in the periphery of the cell; complete disappearance of the Nissl bodies and shrinking of the cytoplasm of the cells.

Neuronophagia was not marked. An occasional cell could be seen surrounded by round cells, but it was only rarely that the nerve cell was replaced by the phagocytes.

The areas where cell destruction was most marked, often showed no traces of nerve cells, the whole of the grey matter being filled with cells with irregular nuclei.

Careful search revealed shrunken cells with unstained cytoplasm. Fragments of cell processes could be rarely observed. Normal cells were often present on the edges of these areas.

The changes in the nerve cells in the medulla and pons were limited to the slighter changes described, very little complete destruction being observed in the cases examined.

The destructive changes were most marked in the motor cells of the spinal cord.

Perivascular cuffing was a prominent feature of all cases. Irregular clumps of cells were diffusely scattered through the whole nervous system.

A complete report is in course of preparation.

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* Gallocyanin was used to stain the nerve cells for this study, as we believed it gave more even staining than methylene blue, thionin or cresyl violet.

# Clinical Features of Poliomyelitis in Los Angeles*

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THE poliomyelitis seen here in 1934 was quite variable in its manifestations and difficult to describe, for there was no uniform clinical picture. The high adult morbidity was itself a variation. The symptoms were, for the most part, milder than usual, and the sequelae were less crippling. An initial toxemia was present in most cases, but this was not often severe, and the early neurological, or localizing findings, which ordinarily help to differentiate pre-paralytic poliomyelitis from the systemic phase of other acute infections, were absent in many cases. The severe frontal headache, or painful oculomotion, that is usually complained of, was not always present. Sore throat, often without local findings, was a frequent complaint. Diarrhea, often with the severe abdominal cramps and vomiting of acute gastroenteritis, was quite common. When seen without systemic or respiratory symptoms, and when developing lumbar cord findings, this was suggestive of an intestinal portal of entry.

Mental dullness at times seemed out of proportion to the degree of toxemia, a cerebral involvement common in some gastrointestinal diseases. Pain in the cervical or lumbar areas was often present, but the usual spinal rigidity was noticeably absent in many cases. In spite of this flaccidity, however, spinal flexion, with stretch of the dura about the nerve roots, caused cervical or lumbar pain in most cases, an early finding which we called the "spine sign." Headache, or pain in the back or abdomen, induced or accentuated by slight trauma, was noticeable, even in those cases showing no increase in intrathecal pressure. The degree and duration of muscle pain, tenderness and severe cramping, were out of proportion to the motor phenomena. The treachery of the disease was more marked than usual, some cases suddenly developing nervous system findings without premonitory symptoms, and others relapsing severely after apparent recovery from mild attacks. Even more striking was the rapid, and apparently complete, recovery of some cases which appeared early to be doomed to extensive residual paralyses. The persistence of reflexes, even in the presence of marked muscle weakness, was most pronounced. Some cases showed no weakness on test, but complained of marked fatiguability.

The sensory phenomena were interesting. Hyperesthesia and accentuation of acute pain and thermal sense were sometimes limited to the extremity

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

opposite that of the motor and proprioceptive phenomena, an indication of a unilateral myelitis. Localized profuse sweating occurred over these same areas. Temporary surface anesthesia over areas corresponding to the nerve distribution from the individual cord segments, was occasionally seen.

The degree of abdominal pain, distention, and vomiting sometimes suggested primary intra-abdominal pathology, but the absence of rigidity, and the association of urinary retention and lumbar backache, seemed to incriminate both the sympathetic and central nervous systems. Also, the sudden relief after spinal puncture, even in cases showing no increased intra-thecal pressure, indicated a paralytic ileus, an uncommon phenomenon in our previous experience.

An unusual number of cases showed no increase in spinal fluid pressure, but were relieved of headache or abdominal symptoms by spinal puncture. Our explanation was the probable relief of cellular edema about the posterior horn cells, or nerve roots, occasioned by shifting of balanced osmotic pressures between the spinal fluid and the perineural circulation or lymph. The shift being toward the spinal canal would tend to reduce capillary tension, and hence edema, even though the osmotic balance between the two systems had been established at a low level.

The tendency to relapse was a constant threat, the recurrence of systemic symptoms suggesting the possibility of reinfection or activation of some focus within the body. Remote sequelae of a psychasthenic or neurasthenic nature were more common than previously noted. Insomnia and nightmare were complained of. Irritability and emotional instability were noted, and some complained of mental fatiguability with poor power of concentration, all of which might be indicative of mild cerebral involvement. Neuro-circulatory asthenia was common, the sudden weakness, vertigo, palpitation and breathlessness probably being due to sudden lowering of vascular tension incident to sympathetic dysfunction. Continued localized sweating was also of probable sympathetic origin, although the common herpes was more likely of posterior horn cell origin.

Space does not permit of a discussion of the problem of differential diagnosis. Unbelievable as it seems, we have seen 55 different conditions sent in as poliomyelitis, which proved to be something else, some of them far removed from central nervous system diseases.

Clinical observations of treatment were interesting. Prophylactic convalescent serum apparently failed to afford any marked degree of passive immunity for, of 207 of the hospital personnel thus injected, 48, or 23 per cent contracted the disease within 3 weeks. This incidence is far above the average for the population at large. These patients were, on the average, far the sickest of any group, and remained longest in the hospital. Overwork and excess fatiguability are probably undoubted factors.

Convalescent serum as a therapeutic agent has proved of value, in our experience. We agree that little is to be expected of it after the central nervous system has been invaded beyond the stage of initial inflammation, but we feel that it has virtue if used in the preparalytic stage, and that present standards of diagnosis permit of this early recognition of the disease. The rapid abatement of symptoms following its use was usually quite striking, and this was further emphasized in those cases which relapsed 2 and 3 times and were immediately relieved on each occasion by additional serum. Intra-thecal medication was not indicated in this epidemic as often as in previous ones, but we still feel that in spite of the failure of ex-

perimenters to demonstrate virus in the spinal fluid, this method of administration has proved valuable in the past, particularly the injection into the cistern in close proximity to the usual portal of entry of virus into the central nervous system. The apparent benefit may be mechanical or hydrostatic, but such cannot be claimed for the more common intra-muscular therapy. Virus has never been demonstrated in the blood, but the fact that immune bodies are present in its serum denotes a relationship, and the rapid dissemination of blood to all tissues of the body, recommends intravenous medication early to bridge the first 18 to 20 hours required for absorption from the muscles.

Immuno-transfusion has been recommended as the one most advantageous therapeutic measure. The arguments in favor of serum apply to the use of blood containing it, and in addition there is the advantage of stimulation afforded the reticulo-endothelial system. The outstanding results obtained with this form of therapy in other virus diseases is well known, but were not duplicated in this experience. The many cases of infection among doctors and nurses threatened us with a shortage of trained personnel, and in an effort to forestall such an emergency and give these patients every advantage, a blanket-order was given to immuno-transfuse all physicians and nurses in addition to giving them intra-muscular serum. This was a fortunate coincidence, for many were mildly ill, and the limited number of suitable immune-donors were consequently utilized for all patients of this group. This facilitated comparison with a parallel group treated with intra-muscular serum, but with intravenous dextrose (10 per cent in normal saline) instead of transfusion with blood. Sixty cases were transfused. Fifty-five of them were unquestionably improved within 24 hours. Five (8.3 per cent) were very much worse in a similar length of time. Naturally there was no way of determining whether or not these patients would have been just as bad, or even worse, without the transfusions, but they were the sicker of the two groups and the transfused group were longer.

On the other hand, the dextrose-treated patients were not consecutive cases of average severity, but were the most toxic of the lay admissions. They were, without exception, markedly improved within 24 hours, some of them from a degree of toxicity that bordered on delirium, to a condition which they described as almost normal subjectively. The reason for the difference in the two groups is not obvious.

Dextrose is valuable in combating any toxemia, because of its part in stimulating hepatic glycogenesis and glycogenolysis, its indirect effect on hydrogen-ion concentration of the blood through ketolysis, and its questionable antivirucidal properties. It is not specific. Immuno-transfusion, on the other hand, is specific, but involves the factor of serum heterogenicity, independent of agglutinins, a factor which cannot be predetermined and one which constitutes a hazard difficult to evaluate. The phenomenon of allergy, or whatever explanation is offered for the spontaneous damage to the choroid produced experimentally in animals by intravenous injections of foreign serums, may have a counterpart in the occasional, unexplained cerebral reaction exhibited by patients during transfusions with apparently homologous bloods. This may account for the small percentage of bad results from immuno-transfusion. We feel that in cases showing involvement of the nervous system, in which no harm can be done by possible injury to already damaged natural barriers, that immuno-transfusion may be safely and advantageously used. There is a definite hazard attending its early use.

# The 1934 Epidemic of Poliomyelitis in Southern California*

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ALWAYS considered baffling and puzzling, first known as sporadic disease and then, as the years went by, growing increasingly epidemic, poliomyelitis always has been protean in nature, and in this 1934 epidemic in Southern California, more than ever has the fact been demonstrated that disease and epidemics, like other affairs in this world, undergo constant change.

Never before in any epidemic have there been so many institutional cases; never so many familial cases; never so many doctors, nurses and other hospital attendants who have contracted the disease; never an epidemic of similar proportions with so low a death rate, with so many of the spinal type, so many with only paresis, or neuritis, so many of the straggling or recurrent variety, so many abortive, so few encephalitic; never before an epidemic where 80 per cent of the cases were hospitalized, more than half of them in the early systemic phase.

November and December, 1933, and January, 1934, we noticed that we were getting about twice the normal sporadic incidence of cases, 6 or 8 monthly instead of the usual 2 or 4.

In the last week of April, 1934, 9 cases occurred, and by the middle of May we found that we were on an upwave that was terrifying in its rapidity. The last week in May gave us a total of 95 cases, 51 for the city, and 44 for the county outside.

Alhambra to the northeast, Belvedere to the east, early became centers of infection and our spot map of the city presented almost a straight line from the Northeastern to the Southwestern part, with a particularly heavy grouping directly to the west of Belvedere into the very center of the city and the Bunker Hill district.

The peak of the wave was reached in the week ending June 9, with 220 cases: June 16 showed 199 cases; June 23, 204 cases; and June 30, 209 cases. There was a rapid rise from May 5 to the peak, then 3 weeks at an almost stationary high, since when there has been a gradual decline.

The total number of cases, city and county, to September 3, 1934, was 1,792, with 25 deaths; cases in city, 1,112, with 15 deaths; cases in county, 680, with 10 deaths; death rate, city, 1.16 per 100,000; county, 0.98; total city and county, 1.08; morbidity or case rate 73.3 per 100,000; mortality rate 1.39 per cent. The Children's Hospital had 1 doctor and 4 nurses contract the disease; the Ross-Loose Clinic, 6 nurses; the Pasadena Hospital, 1 doctor and 3 nurses; the Glendale Medical Group, 2 doctors and 1 nurse; the Orthopoedic Hospital, 1 nurse. The

*Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

General Hospital (to August 27, 1934) had 2 staff doctors, 3 residents, 13 internes, 58 graduate nurses, 39 student nurses, and 22 others—a total of 137 who contracted the disease.

With the exception of the Elmonte Home for Juveniles, capacity 100, where there were 11 cases, juvenile institutions, orphan asylums, etc., were remarkably free. At Juvenile Hall, within a stone's throw of the General Hospital, where the daily turnover is 25 to 30 children, and 250 the average in residence, not a single case occurred.

Early in the year, the majority of cases occurred in those under 5; during the upwave the majority were in the 5–10 year group, the 10–15 year group coming next; but a greater number in the older groups were coming down during the 3 weeks that rounded out the peak of the wave, and since. There was an increasing tendency to attack the older ages as the epidemic waned.

The City of Los Angeles has an estimated population as of January 1, 1934, of 1,293,329, the surrounding county territory, a population of 1,013,775, making a total of 2,307,104, all served by the Los Angeles General Hospital. The New Acute Unit was opened December 12, 1933, just in time for this epidemic. Without this new unit, throwing open new wards, also making available plenty of wards in the old buildings, this epidemic would have overwhelmed us. The normal capacity of the Communicable Disease Building, 6 wards, is 245 beds, with 86 nurses. At the height of the epidemic there were 21 wards with 364 nurses caring for 724 patients, 360 of whom had poliomyelitis.

All epidemic suspects were admitted through the communicable disease admitting room, examined, and assigned to wards as rapidly as possible. Definite cases of poliomyelitis were segregated; suspects and contacts were sifted and grouped. All suspects were held 10 days for observation, and known direct contacts for 14 days. All suspects and contacts released at the end of these periods were required to report back for muscle checks at a specified time, to avoid overlooking mild cases.

During the heavy month of June, the average daily number of suspects admitted was 103, of cases of poliomyelitis 22: a ratio of almost 5 to 1. Patients were parked on stretchers and in automobiles in the court, awaiting admission. Doctors, nurses, orderlies, maids, ambulance drivers, and all others worked overtime, often for 24 to 48 hours without let up. Fatigue, loss of sleep, and constant exposure to poliomyelitis in its most infectious stage was common to all. Slightly more than half of the hospital employees who contracted the disease were directly and constantly exposed; the others were indirect contacts.

A sufficient number of doctors who are thoroughly grounded by precept and practice in "Medical Aseptic Technic" as applied to communicable disease control, and nurses should be available to meet an epidemic of such proportions. Should not the American Public Health Association lay greater stress upon such teaching in the nation's medical and nursing schools?

# Use of Serum and the Routine and Experimental Laboratory Findings in the 1934 Poliomyelitis Epidemic*

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WITH the onset of the poliomyelitis epidemic in Los Angeles in 1934 it was decided to hospitalize all poliomyelitis patients from within the county and city in the Los Angeles County Hospital. This placed additional burdens on many services of the hospital, which in a few weeks increased the patients in the Communicable Diseases Unit from 240 to 750. Among duties assigned to the bacteriological laboratory were:

1. Preparing and testing serum for therapeutic and prophylactic purposes
2. Examination and cultivation of spinal fluids
3. Special laboratory work in isolating the virus and in cross-immunity experiments

It was necessary to establish new emergency units: (1) in the Communicable Diseases building where the spinal fluid work was done, and (2) for the animal experimental work. One hundred and fifty monkeys as well as a number of smaller animals were procured for the special laboratory work. Additional laboratory personnel was required and 18 second or third year medical and graduate students, who were just beginning their summer vacations were selected. These students worked faithfully, and without their services the work here reported would have been impossible. One developed poliomyelitis during the 10th week of the epidemic. The hospital administration provided special needs whenever possible and deserve commendation for their coöperation in meeting the emergency.

The present report is preliminary since much of the work is still in progress. In preparing summaries of the laboratory work it has been expedient occasionally to refer to certain clinical and epidemiologic aspects of the epidemic for comparison. Of special interest in this connection is the group of employees who developed poliomyelitis, a certain percentage of whom received prophylactic serum.

## I. PREPARATION AND USE OF SERUM

At the onset of the epidemic California as a state and Los Angeles as a community appeared to be especially serum conscious, since the state and local health departments advocated its extensive use both for therapeutic and prophylactic purposes. It was not possible from an administrative and clinical viewpoint, though desirable scien-

* Preliminary Report on the preparation and use of serum and the routine and experimental laboratory findings of the Los Angeles County Hospital Bacteriological Laboratory during the poliomyelitis epidemic. Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

tifically, to withhold serum from control groups of patients; consequently the value of the records concerning its therapeutic value is greatly reduced. Controls for the prophylactic use were found in the group who elected to take no serum.

Serum used in the Los Angeles County Hospital was obtained from two sources (1) convalescent pooled serum prepared by Dr. R. V. Stone of the Los Angeles County Health Department laboratories and purchased through the Orthopedic Hospital, (2) convalescent pooled serum and normal pooled serum prepared in our own laboratory. Altogether 121,000 c.c. have been administered to date.

All donors were checked for negative Wassermann and Kahn tests. Donors were bled individually (250–500 c.c.) into suction flasks. In many instances two donors were bled into one flask. Flasks were kept several hours at room temperature, then placed in the ice box over night. Serums were decanted and centrifuged twice, pooled in flasks, 10 to 20 donors to a pool, preservatives added, left over night at room temperature, then put in 20 c.c. or 50 c.c. bottles and kept at ice box temperature until dispensed. The preservatives employed were:

a. Merthiolate 1/10,000
b. Formalin 0.2%, Glycerine 0.5%
c. Phenol 0.25%

Aerobic and anaerobic cultures were made from first and last portions of serum removed from each 1,000 c.c. pooling flask at time of bottling, also from one bottle taken at random from each lot. Cultures were watched for 5 days and before serum was dispensed, bottles were observed in front of a light. Those showing any foreign particles were labelled "For intramuscular use only"; others "For intravenous use." The labels also showed date of pooling and the individual pooling flask from which the bottles were filled.

TABLE I

LOS ANGELES COUNTY HOSPITAL EMPLOYEES WHO DEVELOPED POLIOMYELITIS

May 20 to Sept. 1, 1934

| | | | *Number* | *Number Developing Poliomyelitis* | *Per cent* |
|---|---|---|---|---|---|
| Working in C. D. | | | 483 | 57 | 11.9 |
| Working in other parts of Hospital | | | 3,503 | 57 | 1.3 |
| Physicians | Living in Hospital | | 160 | 16 | 10 |
| | Living Outside Hospital | | 590 | 3 | 0.6 |
| Nurses | C. D. Contact | Living in Hospital | 75 | 27 | 36.0 |
| | | Living outside Hospital | 277 | 24 | 8.5 |
| | Not in C. D. | Living in Hospital | 435 | 37 | 9.0 |
| | | Living outside Hospital | 297 | 14 | 5.0 |
| | Total | Living in Hospital | 475 | 50 | 10.5 |
| | | Living outside Hospital | 609 | 38 | 6.2 |

C. D.: Communicable Disease Unit.

*Prophylactic Serum*—This epidemic has afforded an unusual opportunity for the study of the value of prophylactic serum because of the unusually high degree of communicability. Among the Los Angeles County Hospital employees alone, 115 developed poliomyelitis. Many of these can be traced to contact infection. Table I shows that 11.9 per cent of employees working in Communicable Disease Unit, as against 1.3 per cent of employees in other parts of the hospital developed poliomyelitis; also that among the nurses working in the Communicable Diseases Unit 36 per cent living in the nurses' dormitories developed poliomyelitis. Among the physicians 10 per cent living in the hospital developed poliomyelitis.

Table II illustrates graphically as based on the date of onset the possible sources of infection of the first 5 nurses to develop poliomyelitis, and how they probably were factors in the rapid spread to others. It would appear that we are dealing with a standardized group of individuals since they were working and living under more or less uniform conditions during an epidemic in which the rate of communicability was exceptionally high.

Prophylactic serum was given to all employees who elected to take it. Twenty c.c. of either convalescent pooled or normal pooled serum was given and it was recommended that this or larger doses be repeated every 2 weeks.

Table III summarizes the prophylactic serum administered to employees. It shows that 52.6 per cent of the 115 employees who developed poliomyelitis had received serum prophylactically while 47.4 per cent had received no serum, also that 14 per cent of those working in Communicable Diseases Unit who received serum as a prophylactic measure developed poliomyelitis, against 9.7 per cent of those who received no serum.

Table IV is an analysis of the prophylactic serum in terms of amounts given to the different groups. Several observations may be made: (1) Those receiving convalescent pooled serum showed no less degree of susceptibility than those who received the normal pooled serum. (2) The numbers developing poliomyelitis do not decrease appreciably as the amounts of serum administered increase. (3) Fourteen per cent of employees working in Communicable Diseases Unit who received prophylactic serum developed polio-

TABLE II

POSSIBLE SOURCES OF INFECTION

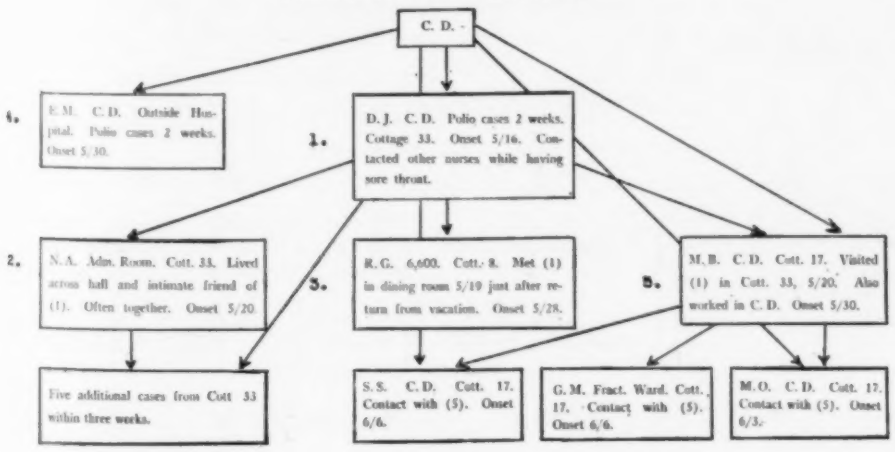
C. D.
4.
E. M. C. D. Outside Hospital. Polio cases 2 weeks. Onset 5/30.
1.
D. J. C. D. Polio cases 2 weeks. Cottage 33. Onset 5/16. Contacted other nurses while having sore throat.
2.
N. A. Adm. Room. Cott. 33. Lived across hall and intimate friend of (1). Often together. Onset 5/20.
3.
R. G. 6,600. Cott. 8. Met (1) in dining room 5/19 just after return from vacation. Onset 5/28.
5.
M. B. C. D. Cott. 17. Visited (1) in Cott. 33, 5/20. Also worked in C. D. Onset 5/30.
Five additional cases from Cott 33 within three weeks.
S. S. C. D. Cott. 17. Contact with (5). Onset 6/6.
G. M. Fract. Ward. Cott. 17. Contact with (5). Onset 6/6.
M. O. C. D. Cott. 17. Contact with (5). Onset 6/3.

TABLE III

POLIOMYELITIS ANTISERUM USED PROPHYLACTICALLY IN LOS ANGELES COUNTY HOSPITAL

| | | *Number* | *Per cent* |
|---|---|---|---|
| Los Angeles County Hospital Employees who developed Poliomyelitis | | 115 | |
| Number who received prophylactic serum | | 61 | 52.6 |
| Number who received no prophylactic serum | | 54 | 47.4 |

| | | *Number* | *Number Positive* | *Per cent Positive* |
|---|---|---|---|---|
| C. D. | Employees who received serum | 228 | 32 | 14 |
| | Employees who received no serum | 261 | 25 | 9.7 |
| Not in C. D. | Employees who received serum | 665 | 29 | 4.5 |
| | Employees who received no serum | 2,825 | 29 | 1.0 |
| Total | Employees who received serum | 892 | 61 | 6.8 |
| | Employees who received no serum | 3,094 | 54 | 1.7 |

myelitis, as against 4.5 per cent working in other parts of the hospital.

Table V shows the severity of symptoms in relation to the two groups, one of which received serum and one no serum. The only fact of significance is that the percentage of those developing paralysis is lower in the group receiving

TABLE IV

DETAILED ANALYSIS OF POLIOMYELITIS ANTISERUM USED PROPHYLACTICALLY BY LOS ANGELES COUNTY HOSPITAL EMPLOYEES

| | | *Amounts of Serum* | *Number* | *Number developing Polio-myelitis* | *Per cent developing Polio-myelitis* |
|---|---|---|---|---|---|
| Working in C. D. | Normal Pooled Serum | 20–40 c.c. | 81 | 13 | 16 |
| | | 40–100 c.c. | 5 | 1 | 20 |
| | | 100 c.c. | 0 | 0 | 0 |
| | Convalescent Serum | 20–40 c.c. | 86 | 14 | 16.5 |
| | | 40–100 c.c. | 39 | 2 | 5.1 |
| | | 100 c.c. | 17 | 2 | 12.0 |
| | **Total** | | 228 | 32 | 14.0 |
| Not working in C. D. | Normal Pooled Serum | 20–40 c.c. | 467 | 22 | 4.8 |
| | | 40–100 c.c. | 7 | 0 | 0 |
| | | 100 c.c. | 0 | 0 | 0 |
| | Convalescent Serum | 20–40 c.c. | 147 | 4 | 2.8 |
| | | 40–100 c.c. | 38 | 2 | 5.3 |
| | | 100 c.c. | 6 | 1 | 16.6 |
| | **Total** | | 665 | 29 | 4.5 |

TABLE V

EMPLOYEES GROUP

PROPHYLACTIC SERUM IN TERMS OF SEVERITY OF SYMPTOMS

| | *No Weakness* | | *Weakness* | | *Possible Paralysis* | | |
|---|---|---|---|---|---|---|---|
| | *No.* | *Per cent* | *No.* | *Per cent* | *No.* | *Per cent* | *Total* |
| Convalescent | 9 | 40 | 14 | 60 | — | — | 23 |
| Normal Pooled | 10 | 27 | 26 | 70 | 1 | 3 | 37 |
| Total | 19 | 32 | 40 | 66 | 1 | 2 | 60 |
| No Serum | 14 | 25 | 36 | 67 | 4 | 8 | 54 |

[a] No deaths in this group

serum, but since the figures are so small it is impossible to attribute a great deal of weight to this observation.

CONCLUSIONS

1. There is no evidence to show that employees receiving prophylactic serum, all having a similar exposure, were more immune than those receiving no serum. In fact the percentage of those developing poliomyelitis is higher among those who received serum than among those who did not. Just why this should be is a question. One explanation might be that those who were most likely to apply for serum were subject to greatest exposure.

2. There is some evidence to show that those receiving prophylactic serum developed less paralysis than those receiving no serum.

*Therapeutic Use of Serum*—Since no controls were used, it is impossible to state whether serum treated cases progressed more favorably than they would have without serum. Convalescent pooled and normal pooled serum were given to alternate cases so far as was possible, and Table VI is a summary of 575 cases to whom serum was given. This table at least indicates that convalescent pooled serum is no more effective than normal pooled serum. Higher percentages are shown among those who developed weakness and paralysis in the group receiving convalescent pooled serum than among the patients receiving normal pooled serum.

*Serum Reactions*—With the administration of human serum to so large a number of people an excellent opportunity was afforded to observe reactions. About 8 per cent of patients complained of some subjective reaction ranging from a mild to a severe type of serum sick-

TABLE VI

THERAPEUTIC USE OF SERUM

| *Serum* | | *No Weakness* | *Weakness* | *Possible Polio* | *Deaths* | *Total* |
|---|---|---|---|---|---|---|
| Normal Pooled | No. | 192 | 50 | 1 | 8 | 251 |
| | Per cent | 77 | 20 | — | 3 | |
| Convalescent Pooled | No. | 191 | 111 | 14 | 8 | 324 |
| | Per cent | 59 | 35 | 4 | 2 | |
| Total | | 383 | 161 | 15 | 16 | 575 |

ness, while about 40 per cent complained of painful reactions soon after injection.

A series of intradermal tests was designed in an attempt to determine the skin sensitivity of patients, and it was found that among the 8 per cent who complained of serum reactions, all of the cases tested who had received serum prophylactically and 60 per cent of those who had received it therapeutically, gave positive reactions, while a much smaller percentage of those who had no serum symptoms exhibited sensitivity.

For the most part two types of preservatives were used in the serum, 1/10,000 merthiolate and formalin-glycerine. When reactions were reported from intramuscular injection, those receiving the formalin-glycerine complained of an immediate severe pain near the injection, accompanied by varying degrees of nausea, dizziness, and weakness. This usually subsided within 20 to 30 minutes, after which no

TABLE VII

REACTION RESULTING FROM THE ADMINISTRATION OF HUMAN SERUM IN LOS ANGELES POLIOMYELITIS EPIDEMIC COMPARED WITH INTRADERMAL REACTIVITY OF PATIENTS

| Prophylactic Administration Total Patients * 65 | | | Therapeutic Administration Total Patients * 61 | | |
|---|---|---|---|---|---|
| | *No. of Cases* | *Per cent* | | *No. of Cases* | *Per cent* |
| Reactive to serum | 5 | 8 | Reactive to serum | 5 | 8.2 |
| Reactive to trauma | 24 | 37 | Reactive to trauma | 25 | 41 |
| Intradermal Tests | | | Intradermal Tests | | |
| Serumatic reactive | 5 | 100 | Serumatics reactive | 3 | 60 |
| Traumatics reactive | 8 | 33 | Traumatics reactive | 6 | 24 |
| No complaints reactive | 5 | 14 | No complaints reactive | 11 | 35 |
| Total patients with allergic histories | 11 | 17 | Total patients with allergic histories | 20 | 33 |
| Allergics reactive to serum skin tests | 5 | | Allergics reactive to serum skin tests | 7 | |
| In terms of allergics | | 46 | In terms of allergics | | 35 |
| Non-allergics reactive to serum skin tests | 27 | | Non-allergics reactive to serum skin tests | 13 | |
| In terms of non-allergics | | 50 | In terms of non-allergics | | 32 |

TABLE VIII

EFFECT OF INJECTING HUMAN SERUM PROPHYLACTICALLY FOR POLIOMYELITIS

TOTAL PATIENTS—65

| | *No. of Cases* | *Per cent* |
|---|---|---|
| Patients with complaints from injection | 29 | 45 |
| Patients without complaints from injection | 36 | 55 |
| Complaints from injection of formalin glycerine serum | 4 | |
| In terms of total injections * of formalin glycerine serum | | 66 |
| Complaints from injection of merthiolated serum | 24 | |
| In terms of total injections † of merthiolated serum | | 41 |
| No complaints from injections of formalin glycerine serum | 2 | 34 |
| No complaints from injections of merthiolated serum | 33 | 59 |

* Total injections with formalin glycerine serum 6
† Total injections with merthiolated serum 58
One patient received unpreserved serum

difficulty was observed. No local tenderness was reported at the point of injection. The merthiolate preserved serum gave no severe reactions at the time of injection but in certain instances soreness developed at the point of injection within 12 hours. This muscle soreness persisted as a rule for about 48 hours.

Tables VII and VIII give summaries of preliminary observations on this point.

TABLE IX

SPINAL FLUID COUNTS

| | *No.* | *Percentage* | |
|---|---|---|---|
| No cells | 434 | 27 | |
| Cells 1–9 | 609 | 38 | 73 |
| Cells 10 | 555 | 35 | |
| Totals | 1,598 | 100 | |
| Globulin but no cells | 85 | 5 | |

### II. OBSERVATIONS ON SPINAL FLUID EXAMINATIONS

There have been made to date 1,598 spinal fluid examinations on 1,300 patients diagnosed as poliomyelitis. The examinations were uniform since they were performed by a special group of technicians.

Table IX shows the cell counts. It will be observed that 27 per cent showed no cells, 38 per cent gave a count of 1–9, and 35 per cent of 10 or more. Five per cent of the total gave a positive globulin test even though no cells were present.

Table X gives a comparison of spinal cell counts with colloidal benzoin tests. Fifty-six per cent of those showing more than 10 cells gave a positive colloidal benzoin reaction against 32 per cent of those showing a count of less than 10.

Table XI summarizes the cell counts on the basis of date of onset. A higher percentage of positive counts was obtained during the first 8 days of onset than later. There was very little difference between the percentage of counts during the first 4 days and the second 4 days.

Table XII correlates spinal cell counts with severity of symptoms. This table may be compared with that of Laidlaw (1932).[1]

While the percentage of those recovered without weakness fails to show any special correlation with high or low cell counts it does show that those cases which at present give indication of a permanent paralysis, and also the deaths, in most cases are among the higher cell count groups.

### III. EXPERIMENTAL WORK

The special laboratory work was organized with the following program in mind. (1) Recovery of virus from the present epidemic. (2) Comparison of the virus with other strains. (3) Neu-

TABLE X

CORRELATION OF COLLOIDAL BENZOIN AND SPINAL CELL COUNTS

| | *Colloidal Benzoin* | | | | |
|---|---|---|---|---|---|
| | *Positive* | | *Negative* | | |
| | *Number* | *Per cent* | *Number* | *Per cent* | *Totals* |
| No cells | 27 | 32 | 58 | 69 | 85 |
| 1–9 | 38 | 23 | 128 | 77 | 166 |
| 10 | 119 | 56 | 78 | 44 | 197 |

TABLE XI

COMPARISON OF SPINAL CELL COUNTS AND DATE OF ONSET

| | *Positive* | | *Negative* | | |
|---|---|---|---|---|---|
| *Days* | *Number* | *Per cent* | *Number* | *Per cent* | *Totals* |
| 1–4 | 128 | 47 | 145 | 53 | 273 |
| 5–8 | 57 | 46 | 64 | 54 | 121 |
| 9– | 24 | 38 | 40 | 62 | 64 |

tralization tests with serum prepared for use in the present epidemic.

Recovery of the virus was attempted from three main sources:

*1. Brain and spinal cord of necropsy cases*—Material from the brain or spinal cord of 11 cases has been injected intracerebrally into monkeys. Monkeys from 7 of these cases have developed temperature curves characteristic of poliomyelitis in monkeys. Monkeys from 5 of the cases only have developed characteristic paralysis and exhibited histopathology in the brain and cord characteristic of poliomyelitis. Two of these strains have been selected for special study and have now been carried through the fifth passage in monkeys.*

Monkeys which have developed characteristic temperatures but failed to develop paralysis have resisted subsequent inoculation with the M. V. strain of virus, thus indicating that recovery from the California strain produces immunity for at least one other standard strain.

The strains of virus which we have passed through several monkeys give an incubation period with an average of 10½ days. This is longer than the incubation period of the M. V. virus at present, and also longer than during its early transmission to monkeys by Flexner and Lewis in 1909.

*2. Nasal Washings*—Nasal washings from clinically positive cases, some showing positive and others negative spinal counts were inoculated into monkeys by the intracerebral route. Of 45 attempts, all were negative with the possible exception of 2 monkeys which developed a characteristic temperature curve but failed to show paralysis.

*3. Concentrated spinal fluids from cases giving positive cell counts*—Twenty-five attempts were made to in-

* Brain and spinal cord tissue from most of these Los Angeles County Hospital autopsies was furnished to Drs. L. T. Webster, J. R. Paul, and J. D. Trask, who were working in Los Angeles Laboratory at the time. Their results and ours were similar in the recovery of the virus.

TABLE XII

COMPARISON OF SPINAL CELL COUNTS WITH REFERENCE TO SEVERITY OF SYMPTOMS

| | *Severity of Symptoms* | | | | | |
|---|---|---|---|---|---|---|
| *Cell Count per c.mm.* | *No Weakness* | *Weakness* | *Possible Paralysis* | *Death* | *Cases, Total Number* | *Per cent Recovery Without Weakness* |
| None | 64 | 24 | 1 | | 89 | 72 |
| 1–9 | 109 | 58 | 3 | 1 | 171 | 64 |
| 10–49 | 82 | 23 | 5 | 8 | 118 | 69 |
| 50–99 | 41 | 10 | 3 | 1 | 55 | 75 |
| 100–199 | 21 | 5 | 1 | 2 | 29 | 72 |
| 200 | 16 | 2 | | 1 | 19 | 84 |
| **Total** | **333** | **122** | **13** | **13** | **481** | |

fect monkeys with spinal fluid from cases with positive spinal cell counts, all with negative results.

Attempts to inoculate young rabbits, guinea pigs, rats, and mice with human tissue from poliomyelitis cases which produced positive results in monkeys were negative.

Neutralization experiments testing the antisera used prophylactically and therapeutically in the present epidemic and also testing the serum of patients recovered from the current epidemic are in progress.

The experimental work in which monkeys have been successfully inoculated with brain and cord from cases of the 1934 epidemic in Los Angeles lends support to the clinical impression that this is an epidemic of poliomyelitis, though there are many points of difference between this outbreak and other epidemics.

Some preliminary evidence has been presented which indicates that monkeys recovered from mild attacks brought on by inoculation with the California virus are immune to subsequent inoculation with the M. V. virus. This fact indicates an antigenic relationship between the two strains.

SUMMARY

The 1934 poliomyelitis epidemic in Los Angeles has been unusual in several aspects.

1. The mortality rate has been exceptionally low.

2. The amount of residual paralysis has been less than usual.

3. The percentage of adults infected has been higher than is common.

4. An exceptionally high rate of communicability has been noted, this being especially apparent among hospital employees where in the communicable disease unit of the Los Angeles County Hospital, 11.9 per cent developed poliomyelitis.

Certain preliminary observations from the laboratory of the Los Angeles County Hospital during this epidemic are as follows:

1. Employees receiving convalescent pooled and normal pooled poliomyelitis serum as a prophylactic measure demonstrated no less degree of susceptibility than employees working under similar conditions who received no serum.

2. There is slight evidence that those receiving prophylactic serum developed less severe symptoms than those who received no serum.

3. Convalescent pooled serum was no more effective when given therapeutically than normal pooled serum. Since no untreated controls were used it is impossible to evaluate the therapeutic use of serum.

4. A small percentage of the patients reported serum reactions, ranging from a mild to a severe type of serum sickness.

5. A high percentage of those who demonstrated positive serum symptoms responded to skin sensitivity tests with human serum.

6. Spinal cell counts of poliomyelitis cases demonstrated that 27 per cent showed no white cells, 38 per cent, 1 to 9 cells, and 35 per cent 10 or more cells.

7. Fifty-six per cent of those showing more than 10 cells gave a positive colloidal benzoin reaction.

8. Attempts to inoculate monkeys with virus from 11 autopsy cases have given positive results from 5.

9. The virus appears to possess an antigenic relationship to M. V. strain since monkeys which recovered from inoculation with the Californian strain are resistant to subsequent inoculation with the M. V. strain.

REFERENCE

1. Laidlaw, F. W. Poliomyelitis in state of New York in 1931, preliminary report of study of 1,559 cases. *J.A.M.A.*, 99: 1053, 1932.

# Orthopedic Aspect of the Los Angeles County 1934 Poliomyelitis Epidemic*

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WITH each succeeding epidemic of poliomyelitis the orthopedic aspect of the acute stage of this disease gains wider recognition and becomes more keenly appreciated. Let us hope that the day is gone forever when the practitioner and the relatives wait until the patient is paralyzed and deformed before seeking orthopedic consultation. Early consultation has, we are thankful to say, enabled the orthopedist to direct his major efforts toward prevention of deformities rather than toward reconstruction. During this epidemic the department of contagious diseases and the orthopedic department have combined their facilities—a great advantage to all concerned, especially to the patient.

## DIAGNOSIS

The diagnosis of early muscle involvement has at times been difficult. During this epidemic the type of onset has been extremely variable, especially among adults. In a good proportion of cases, the onset has been, instead of sudden, extremely insidious, taking as much as 6 or 8 weeks in some instances to reach the peak of muscle involvement. Patients often walked about for days and even weeks with vague sensory disturbances, and muscle weakness before becoming sufficiently disabled or alarmed to seek medical advice. An easily fatigued leg or arm was frequently the only reason for seeking a physician. No doubt a large number of cases were missed. Patients are questioned routinely regarding the presence of painful, tender, weak, and easily fatigued extremities. The physical examination always includes palpation of accessible muscles for the presence of tenderness. If little or no muscle tenderness is noted, the strength of each muscle or muscle group is checked. We have, in the presence of more than slight tenderness, consistently followed the policy of deferring the muscle check. It was soon observed that this was an entirely logical policy. Checking muscle strength in the presence of moderate or marked tenderness is not only inaccurate but will often result in an accentuation of the tenderness.

Scores of conditions have been incorrectly diagnosed as poliomyelitis. The superficial and deep tenderness, and the arthritic manifestations of poliomyelitis must be differentiated from such conditions as acute rheumatic fever, early meningitis, acute infectious arthritis, influenza, acute osteomyelitis, acute myositis, acute bursitis, and many others. Muscular exertion by an individual leading a sedentary life may cause muscle tenderness closely resembling that due to poliomyelitis. In checking for muscle weakness the examiner must

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* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

† Deceased July 14, 1934.

not be misled by weakness resulting from such conditions as an old fracture, healed deep lacerations, chronic osteomyelitis, chronic arthritis, etc.

### ORTHOPEDIC TREATMENT

When a patient is considered to be in the pre-paralytic stage of poliomyelitis he is observed closely for the onset of muscle tenderness or weakness. At the first signs of either sensory disturbances or weakness in an extremity, that extremity is splinted and the patient is placed on a hard bed. If the tenderness becomes marked and generalized, as it so often has, the patient is placed on a Bradford frame. Individual arm and leg splints are applied; the arm splints are bolted to the frame. The extremities and other parts of the body are splinted in a position of physiological rest, a slight advantage being given to some of the more important and more commonly involved muscles. The foot is dorsi-flexed 80° and slightly inverted, the knee is flexed 5° to 10°; the thigh is flexed 10° to 15°; the extremity is abducted 15° and externally rotated 10°. A small pad or pillow is placed beneath the lumbar and lower dorsal spine; its size is varied for comfort. The arms are abducted 75° and brought 30° to 40° anterior to the frontal plane of the body. The forearm is placed in 45° of supination and flexed 75°. The wrist is extended 15°, the fingers slightly flexed, and the thumb slightly adducted. If regular splints are not available immediately after muscle tenderness or weakness is observed temporary splints are fashioned from pillows and sandbags, and when properly applied and watched are satisfactory and comfortable. In certain mild cases they are all that are ever necessary. Few casts are used during the acute and sub-acute stages, but at times they are indispensable. They are used mainly on babies, small children, and uncoöperative adults (particularly doctors and nurses). Casts are bivalved when dry and the top half usually discarded. The muscles and joints are palpated regularly to determine the status of the sensory changes. When muscle tenderness has practically or entirely subsided a gentle muscle check is done. If paresis or paralysis is present the impaired muscles are, if possible, splinted in a position of complete relaxation; for examples, in deltoid paralysis the arm is abducted 90°, in anterior tibial impairment the foot is dorsi-flexed 90° and inverted.

### ANOMALOUS FORMS

The children have usually had a typical form of poliomyelitis, which has, in all but a few cases, been mild. Among the adults there has been a large number of bizarre and anomalous forms. A typical case of poliomyelitis in an adult has been the exception; many cases appeared to be the polyneuritic type. It is not exaggerating to say that among these older patients almost every conceivable type of sensory disturbance has been observed, and many times in the absence of definite motor paralysis. Spontaneous excruciating pain has been one of the severest manifestations. The character of the pain has been widely variable. Sometimes it is dull and boring, at other times sharp and radiating; a paroxysmal causalgic type of pain has also been frequent. Prolonged periods of muscle spasm have often been the source of severe pain; rarely excruciating spontaneous clonic contractions have occurred in lower extremities. Any physical or emotional disturbance frequently causes immediate or delayed accentuation of the pain.

Joints have been one of the most frequent and perturbing sources of pain. In many instances the joints have become exquisitely tender, swollen, and intolerant of the slightest motion. The skin over the involved joints never becomes discolored. An increase in

synovial fluid is occasionally observed, especially in the knee joint. The joints most commonly involved are ankles, knees, shoulders, elbows, and wrists. Intermingled with the various pains are all sorts of disagreeable sensations such as fibrillary twitchings, dysesthesias and paresthesias. Deep tenderness is the commonest sensory disturbance; it is most marked and prolonged at the musculo-tendinous junctions. Hyperesthesia is the next most common sensory change; it is often so intense that the patient resents even the touch of a sheet. Areas of anesthesia have been less common. One patient at present has anesthesia involving all of both forearms, with complete paralysis of both forearms. A partial or total loss of proprioceptive sense is occasionally observed in one or more extremities. Considerable tenderness is frequently observed along the nerve trunks, especially the radial, ulnar, and sciatic. Motor impairment has been as variable and bizarre as the sensory changes. There is no relation between the degree and extent of the paralysis, and the severity of the sensory disturbance. With the exception of a few cases, the motor impairment has been mild and of short duration. Many patients were found to have practically normal strength at the time when the sensory changes first subsided sufficiently to permit a muscle check.

Vasomotor and trophic changes have occurred in varying degrees in the majority of cases. The extremities become cold cyanotic, and occasionally edematous; sometimes they are moist, sometimes dry. In the more severe cases the skin desquamates and is left thin, glossy, and often red. Hypertrichosis occurs in nearly every case. The nails usually become brittle and grow faster, except in the severe cases where they temporarily cease growing. A few adults, chiefly nurses, who had their onset more than 3 months ago still have nerve trunk tenderness and generalized sensory disturbances; also painful and exquisitely tender joints that resist attempts to obtain motion in them. These cases with a clinical picture of cord changes combined with various degrees of peripheral neuritis are suggestive of infectious neuronitis.

### EXACERBATIONS

One of the most interesting characteristics of many adults, especially women, is the occasional recurrence or exacerbation of certain signs and symptoms. Several conditions appear to precipitate these "flare-ups": Anger, fear, hilarity, prolonged severe pain, extreme fatigue, and sudden atmospheric changes. The outstanding symptoms are an increase in superficial and deep tenderness, severe frontal headache, vertigo, diplopia, and, most perplexing of all, vomiting which is frequently prolonged and projectile. These symptoms are almost always associated with a moderate or marked increase in intracranial pressure. A spinal tap has frequently given instantaneous and lasting relief. The duration of symptoms during these periods has varied from 1 day to more than a month. The majority of women patients have at least one such "flare-up." Some have had one after another. The consensus of opinion is that these attacks do not represent an exacerbation of the disease itself, but are more probably due to a vasomotor disturbance or instability.

### ORTHOPEDIC TREATMENT (CONT.)

With children pool therapy is usually instituted soon after the quarantine period has passed, provided their general condition is satisfactory. If there is no sign of skin or muscle tenderness a carefully graduated program of muscle training is instituted soon. The utmost care is constantly employed to keep within the boundary of beginning

fatigue. While there is any evidence of superficial and deep tenderness the muscle training is deferred, but the patient is placed in the salt bath or pool and instructed to execute whatever movements he can without pain. Under this type of therapy the tenderness rapidly regresses and disappears in most cases. Pool therapy is a valuable adjunct in the treatment of poliomyelitis. Water, in a most pleasant way relieves the weak or paralyzed muscle of the antagonistic force of gravity. Patients, old and young, enjoy the water, and by it are kept in a healthy mental state, which is no small issue in the treatment of poliomyelitis. Regular short periods of gentle massage preceded and accompanied by infra-red heat, are instituted when tenderness has practically or entirely subsided, and are persisted in as long as there is any evidence of improvement.

New problems have been encountered in the treatment of adult cases. The exquisite superficial and deep tenderness together with the excruciatingly painful joint involvement have in some instances resisted for week upon end every treatment used. The scope of the treatment in these cases has been considerably limited. Because of the intense pain and tenderness and the likelihood of an exacerbation, pool therapy has had to be deferred for many weeks. As soon as they are tolerated warm salt baths are given. Most patients obtain more or less relief, although a few have been made worse. The utmost care should be exercised to avoid fatigue. Besides the baths diathermy or ultratherm has frequently been used; it is administered over the spine and some of the more painful joints. Many patients experienced definite relief and relaxation from these treatments. In some of the severe cases of long duration joint stiffness has become a perplexing problem. In these, local infra-red heat is applied and when tolerated a program of carefully graduated and limited passive motion is instituted.

An earnest effort is made to build up and maintain a healthy, happy mental state in every patient. This is not easy because one of the most constant symptoms of the adult form of the disease has been extreme irritability and periods of melancholia. Minds are kept occupied; most patients have radios; games are played by the less sick; and books and magazines are supplied. Thanks to Frances Marion and the late Marie Dressler, motion pictures have been made possible. Once a week a first-run " talkie " is shown for the adults, and a " Juvenile " for the children; these shows are heartily enjoyed.

### STATUS OF PARALYSIS

There appears to be no relation between the severity of the onset and the subsequent muscle impairment. Most of the quarantined cases presented evidence at some time during their illness of muscle tenderness and weakness. In the majority of cases the involvement was slight and of short duration. Many patients after having had severe sensory disturbances revealed little or no muscle weakness; certain others had extensive muscle weakness, but of only 4 weeks' or less duration. A small number now after 4 months still have extensive sensory changes and muscle damage. At a later date a chronaxia study and a detailed account of residual muscle impairment will be reported. Among the older patients the upper extremities have been involved nearly as often as the lower. In the lower extremities associated muscles have been more often involved together than antagonists. Upper extremities have been more impaired distally than proximally. Children have seldom had upper extremity paralysis. Of the several hundred General Hospital patients there remain at present only 144 who have muscle involvement of any consequence. Of this

number 24 are males and 120 are females. Thirty-one of the total cases are severe and 113 are mild. The mild cases are expected to recover completely within a few weeks. Of the 31 severe cases there are 17 women, 8 girls, 2 men, and 4 boys. Nine of this group still have more or less generalized sensory disturbances; 22 have no sensory changes but have various degrees of muscle impairment—of these, 12 are adults and 10 are children. In the adult group it is interesting to note that 6 have their muscle impairment in the left arm and left leg. In 8 of the 10 children the paresis and paralysis is confined to the lower extremities and trunks. Of the 31 severe cases it is not too much to expect that within a year nearly half will have practically normal muscle function. We are thankful to be able to look forward to a residual paralysis rate that will be, in the end, probably less than 2 per cent.

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# Henry Street Nurses and Tuberculosis Prevention

DR. WILLIAM H. PARK, director of the research laboratories of the City Health Department, F.A.P.H.A., called on the Henry Street Visiting Nurse Service to help carry on the test of vaccination as a preventive for tuberculosis.

In a letter to Miss Marguerite Wales, General Director, he said:

We have already made very encouraging progress toward showing that vaccination can prevent tuberculosis in many cases. We have not the means, however, to follow beyond the age of 5 years cases which were vaccinated in infancy. Until such provision is made, we will not be able to tell how long the vaccine is effective, whether only for a few years or up to adult life. This information is of great importance.

I know very well the great problem which you face in raising money to carry on your regular work, but I hope in addition that you will be able to obtain the means to follow up these cases. If you do, it will be a very great contribution to the fight to eradicate tuberculosis.

# Poliomyelitis in San Francisco*

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IT is not the purpose of this report to summarize completely the epidemic in Northern California. An authoritative summary of the 100 cases occurring in San Francisco has already been prepared by Geiger, Becker, and Gray. This discussion is based on the daily observation of 51 cases admitted to Children's Hospital, San Francisco, during the first 7½ months of 1934. Although the point of view is entirely clinical, this series should present a fairly valid cross-section of the epidemic, about half as many cases being included in it as were reported in San Francisco.

*Incidence*—During the first 6 months of the year our incidence reflected the increase throughout the state, 1 case being admitted in December, 1933, 1 in January, 1 in February, 2 in March, 1 in April, and 5 in May. A peak of 32 cases was reached in June, and there was a decline to 7 in July and 1 in August. There has been no warning so far of a rise to a secondary peak.

*Age*—The age distribution of these cases is not conventional. Thirty were below, and 21 above 15 years of age; the oldest was 55. The occurrence of a high incidence in the older age groups, a characteristically rural ratio, is hardly consistent with a possible theory that our relatively low incidence in a polio year is accounted for by a high degree of immunity among the general population, nor does the fact that a few of our cases were non-local in origin fully account for this ratio.

*Sex*—In the age group below 15 there is the usual predominance of males in the proportion of 16 to 14, but above this age there were 7 males and 14 females, all 10 of those above 25 being females. Men are freely admitted to the communicable disease department even though only women and children are admitted to the general hospital.

*Contacts*—Most nurses and members of the house staff received "normal" adult serum for its possible prophylactic value, a dose of 20 c.c. or more being administered every 2 weeks during the epidemic. A rigid technic, including masking, was employed and, contrary to some experience elsewhere, no cases developed among attendants. In the general population adult serum was similarly employed to some extent and we had no cases in which this had been previously administered.

Three of the 51 cases followed known contact with the disease and 1 of these justifies especial comment. A 6 year old girl was admitted to the hospital June 13, 1934, on the 5th day of illness, promptly succumbing to bulbar poliomyelitis. Her 4 year old sister, in intimate contact until her admission, was under observation at this time for 2 days, and was given 15 c.c. of con-

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

valescent serum from a serum pool of the Hooper Foundation. This contact developed no symptoms until 17 days after her last exposure and was then admitted with fever and signs of an upper respiratory infection. For 24 hours she apparently improved, her temperature dropped, then she became tremulous, her temperature steadily rose, and 48 hours after admission poliomyelitis was diagnosed. Lumbar puncture revealed 83 cells. Dysphagia and altered speech were evident in a few hours. She steadily and fairly promptly recovered after the administration of 2 successive daily doses of 50 and 25 c.c. of immune sheep serum. This failure of protection will be discussed later.

On the day this patient was admitted a puppy, secured after the death of the first case, became ill, developed strabismus and paralysis of the hind legs, was killed and incinerated before the parents thought of mentioning the matter.

*Diagnosis*—The symptomatology was entirely conventional, headache, fever, malaise, extreme fatiguability, muscle pain, being common complaints. Neck stiffness was the most important physical finding in the pre-paralytic stage with tremulousness next in importance.

The spinal fluid very rarely showed any increased pressure. There was nearly always an increase in cells although 10 of the cases showed cell counts of respectively 1, 1, 3, 5, 8, 9, 11, 15, 17, and 24. In 1 of these puncture was performed only after paralysis was well established; 1 was in a severe bulbar case; 1 had a cell count of only 1 at the onset of spinal and bulbar paralysis; 1, showing 24 cells, had unmistakable symptoms following contact with a brother, ran a rather severe course and recovered entirely. In 5 cases the diagnosis was substantiated only by characteristic pre-paralytic symptomatology.

*Suspects*—Along with those diagnosed poliomyelitis 55 suspects were admitted for study, in most of whom pathology not due to poliomyelitis virus was readily demonstrable. The symptoms which occasioned admission were most commonly due to respiratory infection. There were 22 patients in which tonsillitis, otitis, adenitis, bronchitis, pneumonia or influenza-like upper respiratory infection accounted for conflicting symptoms. There were 2 cases of measles and 3 of exanthem subitum. Among the suspects was 1 case of typhoid, 1 of erythema nodosum, and 1 presenting the clinical features of mild dengue, although we were reluctant to make this diagnosis in the absence of proof of a possible vector. Five patients, 3 of whom were contacts, revealed no sign of any disease. Three patients had symptoms dependent on trauma, 1 entered during an epileptic seizure, 1 during an episode of migraine, and 1 during a reaction to tetanus antitoxin.

The most interesting diagnostic problem was afforded by other types of central nervous system infection. There has been during the last several months an unusual incidence of mumps meningo-encephalitis, the authors having seen 8 cases. Four of these were among the cases admitted for observation in this series, the diagnosis being indicated by the accompanying parotitis, the lymphocytic fluid, and the course. One case of poliomyelitis developed mumps without neurological complications early in his convalescence from the former disease. One case admitted as poliomyelitis was diagnosed epidemic encephalitis, the diagnosis being borne out by the protracted course and typical findings. Three cases in the series had headache and indefinite meningeal signs along with mild dysentery.

If it is true that poliomyelitis epidemics are accompanied by innumerable sub-clinical cases of the disease, it is surprising that at a time when popular apprehension and medical alertness

were attuned to investigate the slightest symptoms, in only 6 of the 55 admissions for observation were we unable, in the presence of some evidence of illness, completely to rule out sub-clinical poliomyelitis or make a positive alternative diagnosis. If the present epidemic was accompanied by many sub-clinical cases most of these must have been entirely asymptomatic.

It has been a common observation that epidemics of poliomyelitis occur during periods when other epidemic diseases are not present. In contrast to this, the present epidemic occurred during the wane of measles incidence and when there was coincidentally a great deal of respiratory infection and other forms of acute illness. The differential diagnosis of influenza-like upper respiratory infections with headache and generalized pain, measles, and other of the acute infections mentioned, from poliomyelitis was a difficult problem particularly because of the occurrence of mild cases of poliomyelitis and of a very few with normal or nearly normal spinal fluids.

*Treatment*—In the treatment of these cases we have proceeded on the belief that convalescent serum, the serum of immunized animals, or the transfusion of large amounts of normal (and potentially immune) blood offers a legitimate hope of specific therapeutic effect. Our eagerness to employ these measures definitely encourages the beneficent by-effect of early observation with the consequent employment of prolonged rest and the early use of orthopedic measures.

Our present and past cases are insufficient to permit statistical conclusions regarding the efficacy of treatment, and we have always avoided drawing arithmetical comparisons as an index to therapeutic effect. The propriety of basing an opinion upon the purely numerical end results in treated and untreated cases may be questioned for several reasons. It is, of course, obviously incorrect to treat all early cases and use those admitted late as "untreated controls." Conversely, if alternate cases are selected for treatment, the results in treated and untreated cases can be compared only if similar conditions prevail throughout the series.

It is difficult to conduct a clinical experiment along the lines pursued in the laboratory even if one were temperamentally able to resist the tendency consciously or unconsciously to select one's cases. In the laboratory, controls are employed for each variable in an experiment, but it is impossible to provide adequate controls for the innumerable variables which exist in this clinical experiment. These experimental variables affect the patient, the disease, and the therapeutic serum.

Patients manifest different responses to the disease and at the same time to the effect of therapy because of age, size, individual variations in immunity, and because of alterations in the immunity of the individual occasioned by fatigue, physical changes, the influence of other infections, etc.

Variations in the infection occur with respect to individual epidemics, season, location, and the changes in virulence which accompany the rise and fall of an epidemic. The effect of variations in the dosage of the infecting virus, dependent on the duration and intimacy of exposure, is commonly not considered although the influence of this factor on the intensity of disease may be clearly seen in other childhood infections.

Convalescent serum obviously falls far short of the antibody content of therapeutic serums employed in other diseases. It is difficult to evaluate quantitatively the antibody content of any antiviral serum, but there must be a tremendous variation among those used in poliomyelitis. All types of serum are employed in therapy, moreover, in various amounts. A proper

quantitative relationship between the age, size, and response of the patient to the severity, localization and stage of the infection, and the amount and "titer" of a therapeutic serum which must be employed to constitute effective therapy is yet to be established. This has been done in other infections in which specific therapy is successfully employed; without such a scheme of treatment it might be difficult to evaluate statistically the effect even of antitoxin in diphtheria.

The real problem, as yet unsolved, is whether or not any patient with poliomyelitis can be benefitted at any stage by any amount of serum. We have tried to meet this problem by treating cases at the earliest possible moment with large doses of serum repeated at very frequent intervals, and in the case of a convalescent serum varying the source. The view that the serum has effective properties is somewhat discouraged by the incident quoted earlier in which the disease followed exposure despite the prophylactic administration of 15 c.c. of convalescent serum. Such occurrences, however, are not uncommonly encountered in the prophylaxis of measles with convalescent serum and although they are equally hard to explain they are insufficient to discredit the fact that measles convalescent serum usually protects against this disease. Measles prophylaxis presents other points of similarity which might be mentioned inasmuch as it is here also necessary to regard quantitative relationships between age, size, degree of exposure, elapsed time after exposure, and dose of serum. The possibility that in poliomyelitis, as in measles, modification of the disease by serum rather than complete ablation of all symptoms may be brought about, must be borne in mind, and the observations over the last 10 years encourage us in this belief.

*Outcome*—The course of the cases in the present epidemic favors the opinion that convalescent serum is a beneficial factor although obviously it was not the sole factor influencing a favorable or unfavorable outcome. In some cases prompt improvement followed serum therapy and the whole infectious picture presented by the patient was markedly altered. This effect was seen particularly in patients with high spinal fluid cell counts and typical symptomatology in which over a period of 2 to 5 days prior to treatment there was little change in either direction. In a number of these the improvement following serum was so prompt both subjectively and objectively that the influence of therapy was almost unquestionable. In other cases there was a slower subsidence of symptoms but the end result seemed materially better than could reasonably have been predicted, granting the difficulty of such predictions. Only rarely were end results unfavorable and in these it was impossible to be sure that adequate antibodies were applied sufficiently early.

In this series there were 17 cases which were treated preparalytically in which both clinical and laboratory evidence clearly substantiate the diagnosis. In 15 of these, following intensive serum treatment there developed only very slight and transient paralytic phenomena which had completely cleared by the end of the 3 weeks of isolation. These favorable cases include a few regarding which we were optimistic from the outset, a number in which the outcome was characteristically unpredictable, and several in which the symptoms were so severe as to justify a very unfavorable prognosis. In 2 the results were unfavorable, 1 represents a failure of what we regarded as adequate therapy, the other was treated, we feel, inadequately for 3 days before entering the hospital badly paralyzed and still in the febrile stage.

In all of the cases which entered the hospital after paralysis was evident but

in which active symptoms of infection still persisted, specific therapy was applied. In these cases it is impossible to arrive at more than an impression regarding beneficial effects, but this impression is that a certain amount of modification of the disease was brought about by specific therapy. Such a therapeutic result may be compared with that effected by the transfusion of large amounts of immune blood during the febrile course of measles. An especially favorable effect was observed in bulbar cases in which paralytic symptoms commonly appear almost coincidental with the initial rise in temperature and in which a grave prognosis is usually justified.

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# Borough of Willesden, England

THE 1933 annual health report of the Borough of Willesden, England, reveals many interesting health activities. The estimated population for midsummer 1933 was 190,875, the area 4,384 acres, giving an average of 43.3 persons per acre. The general death rate was 9.88 against a birth rate of 13.99.

The infant mortality of 46.05 per 1,000 births was the lowest rate ever recorded for Willesden. About 36 per cent of expectant mothers attended prenatal clinics conducted by the health department, while 46 per cent of the births took place in hospitals. Midwives are directly under the supervision of the health department, being trained in the Maternity Hospital. There were 13 cases of puerperal fever, 4.7 cases per 1,000 total births; 4 of the cases were fatal. Each case of puerperal fever and each death occurring in childbirth are investigated by a consulting obstetrician. The Maternity and Municipal hospitals are under health department supervision.

There were 392 cases of diphtheria, 11 deaths; 1 of smallpox, no deaths; 13 of typhoid fever, 1 death. Four small outbreaks of food poisoning were investigated; the largest of these, affecting 23 persons and causing one death, was attributed to staphylococcus aureus by the Pathological Laboratory of the Ministry of Health.

To combat the increasing death rate from cancer, bi-monthly clinics are held at each of two centers, for the purpose of diagnosis. In addition arrangements are made with certain large London hospitals for referring patients for further diagnosis and for treatment.

Children are examined and attempts are made to correct defects in the secondary and trade schools, as well as in the elementary schools. Much dental work is done for children from infancy until they finish elementary schooling, and for expectant and nursing mothers. At four feeding centers in the city, breakfasts and dinners are provided to school children of unusually poor parents. Children who pay may also obtain hot dinners at these stations.

# Western Public Health Problems*

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TODAY in connection with our parent organization we open our Fifth Annual Meeting since the birth of the Western Public Health Association in 1930. There is no doubt whatever that the Western Public Health Association has ably served its purpose of promoting professional intercourse in the western part of the United States, and furthering the interest of the public health of the people. In spite of the fact that the association was launched during the depression, attendance at meetings has been gratifying. The western states not only have the usual problems of public health and sanitation common to the rest of the country, but also problems that, because of our climate and our nearness to the Orient, are of special significance to health officers in this section. It is gratifying to note the splendid support given our organization by the American Public Health Association, and we hope that when financial conditions are better support may be increased.

If the Western Branch is to accomplish its best results, substantial endowments and contributions of money should be secured.

I feel the organization owes a great deal to the time and effort spent by our able secretary, Dr. W. P. Shepard, without whose services the organization would be seriously handicapped. It is not too much to hope that in the future our organization may look forward to a full-time secretary with at least a modest budget.

There are several urgent problems before western public health officers, a few of which we may mention here. Psittacosis presents a unique problem in public health control. The known facts definitely connect the presence of infected psittacine birds with the spread of this disease to human beings, nevertheless, control measures have been extremely difficult and, unfortunately for California, the disease has caused outbreaks in other sections of the country. This disease illustrates the exposed character of the western states, because there is evidence to show that it was introduced into California from Brazil. Nothing short of extirpation of all infected birds in California will suffice for its eradication. According to U. S. Public Health Officer V. M. Hoge (*Public Health Reports*, 49:451 (Apr. 6), 1934), there is a long list of susceptible species of birds, which includes poultry. This situation in regard to psittacosis serves to emphasize the need for extension of the research resources on the Coast, both from the U. S. Public Health Service and through private support.

Plague continues to be a serious menace not only to California but to the entire coastal area. Recently, in Kern County, Calif., an area of approximately 409 square miles, was found to be heavily infected with plague in ground

* Address of the Retiring President, Western Branch, American Public Health Association, delivered at the Sixty-third Annual Meeting of the American Public Health Association and Fifth Annual Meeting of the Western Branch, In Pasadena, Calif., September 2, 1934.

squirrels. The total area involved, including a portion of Tulare County, is 945 square miles. One infected child was reported in this area, and more human cases would have occurred except that the district is sparsely settled. Plague has been proved, by dissection and laboratory tests, in 162 squirrels (Selvatic Plague, Its Present Status in California, K. F. Meyer, Ph.D., *California and Western Medicine*, 40:407 (June), 1934). Needless to say, the situation is receiving prompt and efficient attention in the eradication of ground squirrels. A proposed state-wide program under S.E.R.A. for an intensive ground squirrel eradication is under consideration.

Other diseases which give us marked concern in the western states are undulant fever, Rocky Mountain spotted fever, tularemia, rabies, and tuberculosis. This list is not an exhaustive one, but these are perhaps the most important.

In regard to tuberculosis, of course, our problem has been one mostly of the importation or migration of cases from other parts of the United States. Nevertheless, with our growing population we can truthfully say that we have a problem of indigenous tuberculosis as well. It is noteworthy that in the last 20 years the tuberculosis death rate in California has been reduced from 198.3 per 100,000 population, to 72.3. It is surely necessary that we greatly extend our efforts in regard to this common communicable disease in the finding of missed cases in the search for contacts, and in proper hospitalization and isolation of infective persons.

I need scarcely remind this audience of the discovery by McCoy in 1911 of tularemia in Tulare County, and the fact that this disease is quite widespread throughout this area. Coccidiodal Granuloma was also discovered in California by Rexford in 1894; and Ophüls and Ash in 1905 discovered the oidium coccidiodes, the general source being located in the San Joaquin Valley.

It is interesting to note that the first reported death from rabies in California occurred in 1892 from a skunk bite. We must admit with shame that rabies is still very prevalent, and that adequate measures for its eradication have not received public support. Recently in San Diego a young girl died from this disease, and last year one death occurred in Los Angeles County.

Since the work of Dr. Charles Browning, of Highlands, on the black widow spider (*latrodectus mactans*) in 1901, additional research by Bogen and Berman of Los Angeles County has revealed this spider as a serious menace and the cause of quite a few deaths, the true origin of which had probably been overlooked.

The menace of botulism, as a result of the pioneer work of Wilbur and Ophüls, followed by Dixon, Geiger, and Karl Meyer, has been very much lessened. Nevertheless, we must constantly be on guard in supervision of canning, particularly of home methods. It is rare indeed that any case of botulism is traced to commercial canning, so effective have been protective measures. We must continue to insist to the public that *all home canned vegetables and other non-acid foods should be thoroughly boiled before use.* Any canned product which has a leaky lid or an " off odor " should be treated with suspicion and, above all, no householder should even taste any suspected products.

The early work of Kellogg and Kilyoun with plague in 1894 may be recalled to your minds. The struggles during that early period with the politicians should give us some sense of gratification when we consider the prompt response of states and municipalities to our requests for aid in the presence of this menace today. The influence of Rupert Blue in those early

days has been felt throughout the state to the present time. We must admit, however, that there is much progress yet to be made in some of our large cities which are derelict in not providing proper rat-proofing of buildings and other measures.

Diphtheria antitoxin was first used in Los Angeles City in 1895. Los Angeles City was also one of the first, if not the first, to establish a municipal nursing system, which it did in 1898.

Smallpox is still a menace in our western states, especially in California, because of the peculiar resistance we meet from the cultists. This situation is worthy of some analysis. It appears historically that cultism and irregular practitioners of medicine have been a problem in California and perhaps in all of the western states since the earliest days. Although California was the third state of the Union to establish a State Board of Health, having done so on March 8, 1870, nevertheless, the struggle against quackery began early and still continues, and is mostly unsuccessful. The first Medical Practice Act in the State of California was established in 1876, and included not only the regular M.D.'s but homeopathy and eclecticism. The first secretary of the State Board of Health, Thomas M. Logan, made many notable advances, and was a man of great energy and ability. He was also the first resident of California to be president of the American Medical Association.

It is interesting to note that in 1885 the total number of certificates issued by the Board of Examiners of the California State Medical Society was 1,698; the number issued by the homeopathic boards, 217; by the eclectic board, 294; total, 2,209; the number of persons practising medicine without a license was 485. The proportion of population to each licentiate was 1 to 838. In 1925 after the passage of the chiropractic initiative in 1923, an estimate made by Musgrave (*California & Western Medicine*, 23:598 (May), 1925) calculated that there was one doctor of some sort operating to each 100 population—about 31,000 altogether. Of these, only 8,000 held physicians' and surgeons' licenses. The author admits that the licensing system has not protected the public from cults and quackery.

A recent survey made in Los Angeles County by myself gives the following figures: total practitioners of all kinds, 7,636; regular M.D.'s, 3,918; osteopaths 927; chiropractors 1,440; optometrists 550; Christian Science practitioners 1,200; naturopaths and midwives 101. It is significant that the 1,440 chiropractors have come into being since 1921. Throughout the United States it is estimated that $125,000,000 —a sum equal to the entire amount spent on public health—goes to the irregular group of persons practising medicine. I have estimated that if the amount spent for patent medicines and quackery could be entirely eliminated, the income of each regular medical man in Los Angeles County would be increased annually between $3,000 and $5,000. A recent book by a newspaper writer, Morro Mayo, states as follows: (Los Angeles, by Morro Mayo, Knapf & Co., 1933, p. 269):

> In addition to its preëminence in the fields of material progress, morality, and patriotism, it is universally recognized that Los Angeles leads the world in the advancement and practice of all the healing sciences, except perhaps medicine and surgery. Eastern medical science having failed either to rejuvenate the members of that multitude of the aged which each year escapes from harsh winter, or to perform magic for the accompanying army of the sick, many of these people gravitate naturally to the practitioners of divine healing, fortune-telling, and miracle-making, all of which are legalized professions in Los Angeles. The City of the Angels has more osteopaths than any city in the world, and in proportion to its own estimate of population three times as many chiropractors as any other municipality on earth.

The city is internationally famous for its metaphysical versatility, and each year erstwhile Christians in alarming numbers desert the orthodox evangelical churches for temples more bizarre. It is largely, perhaps, a climatic phenomenon. After the frozen folk of Vermont and Wisconsin have been exposed to the melting atmosphere of Southern California for ninety days, a subtle change comes over them. Thereafter they demand something more exotic, if not more erotic, than the frigid stuff to which they have been accustomed. This accounts for all the theological love-cults and spiritual schools of sex aberration. Briefly, it may be set down that any geomancer, soothsayer, holy jumper, herb-doctor, whirling dervish, snake-charmer, medicaster, table turner, or Evil Eye—practising any form of black magic, demonology, joint-jerking, witchcraft, thaumaturgy, spirit-rapping, back-rubbing, physical torture, or dietetical novelty—any such will find assured success and prosperity in Los Angeles despite fierce competition. All kinds of quacks, therefore, have poured into Los Angeles and Southern California for the last twenty years.

The greatest of these, one of the most remarkable women on earth, was, and is, the Reverend Aimée Semple McPherson.

California particularly has been more or less held up to the United States as the home of quackery. A brief examination shows, however, that California has been much sinned against. Osteopathy is an importation from Kirksville, Mo., this school having been originated there in 1896 by Andrew Still. Andrew Still himself places the date as June 22, 1874. The Pacific College of Osteopathy was started in Los Angeles in 1896. For this contribution we have Missouri to thank. The next group, which is now the largest—chiropractic—is an importation from Davenport, Ia. There, in 1894, B. J. Palmer brought to the light of the world the discovery that the nerves which emerge from the spinal column become pinched through twists and defects of various kinds, and therefore cause all kinds of diseases. We have Concord, N. H., to thank for the development of Christian Science. It is interesting to note that as early as 1884 the California Metaphysical Institute was started by emissaries of Mary Baker Eddy. New York contributes the Theosophical Society, and Katherine Tingley founded the Point Loma Society in San Diego in 1875. Kansas City, Mo., contributes naturopathy, nudism, Unity, and chirothesia. Our most shining example locally of faith healing, hypnotism, mesmerism, and publicity in general, comes from Ontario, Canada—our unparalleled Aimée Semple McPherson. To San Francisco we look for Brother Abrams, now departed, with his box, oscilloclast, and other doo-dads.

The exact origin of the anti-vivisectionists I have been unable to locate. It is noted, however, as early as 1896 an organization appeared in Massachusetts. We therefore might voice the suspicion that this state contributed the pest of anti-vivisection to the West. It may be truly said that Bernarr MacFadden has created a school of physical cultists who, by reason of their opposition to our organized public health procedures, have multiplied our difficulties. To New York we may give credit for the development of this source of our difficulties. Therefore, while it may be true that cultism, possibly because of our climatic and other conditions, flourishes nobly on the Pacific Slope, we may justly claim they are importations, and not indigenous. In many respects we would be much better off with our Indian medicine men, who at least knew nothing about high pressure salesmanship.

During the course of the year your president submitted to a number of prominent public health authorities throughout the United States, and to officials of the American Public Health Association, a proposal of the Los Angeles County Medical Association in which definite demands were made to delimit sharply the work of the public health officer. These data were compiled, copies made and bound and made available to members of our Western Public Health Association. Much

favorable comment has been received as a result of this survey of opinion. A few copies are still available, through the author, for those who wish them.

Briefly speaking, there is no doubt that certain elements among our medical fraternity are desirous of eliminating all treatment of any kind from the program of health departments, even including the giving of advice on formulas and diets in our well-baby conferences. Health education is to be limited to the masses, and not to be given to individuals. Physical examinations are to be confined to those suspected of tuberculosis and venereal diseases, but no treatment whatever is to be given. The X-ray must be turned over to welfare departments. Health camps and preventoria are to be administered by welfare departments and not health departments. Vaccination and immunization must be done, except during epidemics, by private physicians, and fees paid therefor by the health department. Public health nurses must not call on any family of patients being cared for by private physicians except with their consent. As a result of this movement, the State of California now has a clinic bill which, except for the protest of myself and the school physicians, would have placed under a license system even the routine work of the health officer in prevention. A formal charge has been lodged against the health officer that public health work tends to encourage pauperization, and that the medical work of the health department should be entirely limited to those who are certified as indigents by the welfare department.

Time does not permit a complete analysis of these problems. The American Public Health Association at its meeting in Indianapolis adopted an official declaration of attitude on the basic health services of health departments. This declaration stated that leadership and responsibility should be vested in full-time trained health officers appointed by professional qualifications, and reiterated that the annual appropriation for official health work should be at least $1 per capita.

In tuberculosis control, the X-ray was an absolute essential for diagnosis and checking of progress. In the handling of venereal diseases the clinic was recognized as a necessity. In the promotion of child health, provision for prenatal care, infant welfare, preschool and school hygiene were stressed. Duplication between school health services and public health services is to be avoided. The demonstration of sound methods in child hygiene and the provision of personal services were approved, especially where these services could not otherwise be obtained. Public health education, both through mass efforts and personal and group demonstrations, was approved. Research work in all lines of public health work was stressed. It was noted that the health officer should participate in the planning and coördination of all health activities in his community. Health conferences, or preventive health center medical services, were justified as a means of creating a demand for such services, as an agency for inaugurating proper standards, and to supplement the preventive services of private practitioners. Diagnostic facilities and clinical treatment for communicable diseases, and individual instruction in personal hygiene through medical conferences and visits by public health nurses should be provided by health departments for all persons needing such services and not in a position to obtain them, under conditions which make their general utilization reasonably probable. In deciding whether a given health procedure should be conducted by the department itself or by individual medical practitioners or other agencies, the primary consideration should be the welfare of the community, and where

efficiency and economy are reasonably equal preference should be given to a program which decentralizes health procedure so as to enlist the private practitioner in carrying them out.

In the organization and make-up of the Los Angeles County Health Department there are 25 full-time medical officers, and 52 part-time medical men. Thus there are more than twice as many men employed by the health department who are also in private medical work than there are full-time men.

In regard to the program of immunization against diphtheria and smallpox, we immunized against diphtheria last year 16,929 persons with a cost of $.41 per person. We immunized against smallpox 19,655 persons at an average cost of $.23 per person. We spent $3,000 on a program wherein 16 nurses visited 18,000 homes and endeavored to send the children to the private physician for immunization. Only 500 immunizations resulted, which makes the cost $6 per immunization. I therefore question whether as a matter of economics the average health officer can afford to adopt the Detroit Plan of paying $2.50 per person for immunization which can be performed by the department for from $.25 to $.50 per person. Economics to a large degree will answer this question.

In closing, may I express my appreciation for the honor which has been bestowed upon me, and may I express the hope that the Western Branch of the A.P.H.A. will have a splendid and rapid growth in the future.

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# National Recreation Congress

BRINGING together the strands of many national and local movements for the enrichment of American life, the Twentieth National Recreation Congress, held in Washington, D. C., October 1–5, 1934, presented as complete a picture as this generation has had of the progress and problems of public recreation in the United States. There were 24 section meetings, 4 symposia, and 8 general sessions. The 900 delegates attending considered the swiftly declining birth rate, the plight of thousands of young people out of school and college and unwanted in industry, the idleness of the millions of older unemployed, changing interests of Americans in their leisure, shrinking appropriations for recreation, and other questions.

Significant of the federal government's new aggressiveness in developing the nation's recreational resources, and particularly its lands, were the reports made by representatives of the National Park Service, National Forest Service, Office of Education, The Children's Bureau, the Agricultural Extension Service, the Federal Emergency Relief Corporation, the Subsistence Homestead Corporation, the Tennessee Valley Authority, the Biological Survey, and the National Resources Board.

# Secondary Cases of Certain Communicable Diseases Among Non-Immune Family Contacts

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IN order to determine the relative infectivity of scarlet fever, mumps, chicken pox, whooping cough, and measles, a study was made from data for 1930, 1931, and 1932, secured in Berkeley, Calif. The number of secondary cases among susceptible family contacts was obtained and the secondary attack rate per 100 of these contacts was computed. The observations were made from epidemiological histories of 105 cases of scarlet fever, 1,716 of mumps, 1,456 of chicken pox, 1,043 of whooping cough, and 2,344 of measles, all of which had been reported to the city health department.

The following definitions are used in this study:

*Primary case*—The first case appearing in a family. When 2 cases appeared simultaneously or when 1 followed the other before the expiration of the minimum incubation period only the first case was listed as primary with susceptible contacts, the second being classified as primary cases with no susceptible contacts.

*Susceptible contact*—Any person in the family group who did not give a history of a previous attack of the disease. In this study it was impossible to separate the susceptible children and susceptible adults. For this reason the group of suspectible contacts may be fictitiously large as some of the adults may have had a previous attack which was forgotten. However, the histories were all taken by trained public health nurses and every effort was made to obtain accurate information.

*Secondary case*—Any member of the family group developing the disease after the expiration of the minimum incubation period, dating from the onset of the primary case.

*Secondary attack rate*—The percentage of susceptible family contacts that developed the disease.

The secondary attack rates for the 5 diseases studied are shown in Table I. They bear out the generally accepted idea that scarlet fever (secondary attack rate 6.0) is relatively less communicable than the other common communicable diseases,[1] that measles (50.5) is highly communicable, and that the communicability of mumps (26.9) chicken pox (38.8), and whooping cough (40.9), falls between the 2 extremes.[2]

The secondary attack rate of measles is more than 8 times that of scarlet fever, in spite of the fact that approximately twice as many susceptible persons were exposed per primary case in scarlet fever as in measles, the ratios being 3.1 and 1.6 respectively.

The secondary attack rate of 50.5 for measles is somewhat lower than that found by other observers. This is

TABLE I

ATTACK RATES AMONG SUSCEPTIBLE FAMILY CONTACTS

SCARLET FEVER, MUMPS, CHICKEN POX, WHOOPING COUGH AND MEASLES

| | Total number cases | Primary cases no susceptible contacts | Primary cases with susceptible contacts | Number of susceptible contacts | Number of secondary cases | Secondary attack rate |
|---|---|---|---|---|---|---|
| Scarlet fever | 105 | 9 | 81 | 250 | 15 | 6.0 |
| Mumps | 1,716 | 433 | 806 | 1,770 | 477 | 26.9 |
| Chicken pox | 1,456 | 447 | 572 | 1,126 | 437 | 38.8 |
| Whooping cough | 1,043 | 344 | 402 | 726 | 297 | 40.9 |
| Measles | 2,344 | 909 | 800 | 1,258 | 635 | 50.5 |

probably because of the difference in the age composition of the groups studied and because only those cases developing after the minimum incubation period were used in computing our rates. Chapin [3] found a secondary attack rate of 76.2 among 8,300 susceptible persons exposed to 8,043 primary cases. However, he included among his secondary cases every case in the family except the first, even those developing on the same day with the primary case. If the 1,723 cases developing during the first 7 days of illness of the primary case are excluded from Chapin's series the secondary attack rate is 65.1, not greatly in excess of that found in this study. The rate of 53.3 found by Halliday [4] is based on a study of 120 susceptible contacts living in tenements in Glasgow under such conditions that "from the epidemiological standpoint, each tenement building described may almost be regarded as a household in itself." Of the 120 susceptibles 64 developed measles but in this number were 13 primary cases. If the primary cases are subtracted it leaves 107 susceptibles, 51 of which developed the disease, a secondary attack rate of 47.7, slightly lower than that found by us. Butler [5] found that of 3,039 susceptibles

TABLE II

COMPARISON OF ATTACK RATES AMONG SUSCEPTIBLES

MEASLES

| | Chapin | | Halliday | | Butler | Kelly and Reite |
|---|---|---|---|---|---|---|
| | Original | Corrected | Original | Corrected | | |
| Susceptible contacts | 8,309 | 8,309 | 120 | 107 | 3,059 | 1,258 |
| Secondary cases | 6,333 | 4,580 | 64 | 51 | 2,023 | 635 |
| Secondary attack rate | 76.2 | 55.1 | 53.3 | 47.7 | 66.1 | 50.5 |

TABLE III

ATTACK RATES AMONG SUSCEPTIBLE CONTACTS IN FAMILIES WITH 1, 2, 3, 4, AND 5 OR MORE SUCH CONTACTS
SCARLET FEVER, MUMPS, CHICKEN POX, WHOOPING COUGH AND MEASLES

| No. Susceptibles in Family | Scarlet Fever | | | | Mumps | | | | Chicken Pox | | | | Whooping Cough | | | | Measles | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Primary cases | Susceptible contacts | Secondary cases | Secondary attack rate | Primary cases | Susceptible contacts | Secondary cases | Secondary attack rate | Primary cases | Susceptible contacts | Secondary cases | Secondary attack rate | Primary cases | Susceptible contacts | Secondary cases | Secondary attack rate | Primary cases | Susceptible contacts | Secondary cases | Secondary attack rate |
| 1 | 10 | 10 | 0 | 0 | 290 | 290 | 84 | 29.0 | 258 | 258 | 122 | 47.3 | 206 | 206 | 108 | 52.4 | 496 | 496 | 255 | 51.4 |
| 2 | 23 | 46 | 0 | 0 | 258 | 516 | 129 | 25.0 | 170 | 340 | 135 | 39.7 | 118 | 236 | 95 | 40.2 | 195 | 390 | 184 | 47.2 |
| 3 | 20 | 60 | 4 | 6.7 | 152 | 456 | 130 | 28.5 | 88 | 264 | 102 | 38.6 | 50 | 150 | 46 | 30.7 | 74 | 222 | 109 | 49.1 |
| 4 | 17 | 68 | 8 | 11.8 | 62 | 248 | 70 | 28.2 | 33 | 132 | 52 | 39.4 | 16 | 64 | 22 | 34.4 | 26 | 104 | 60 | 57.7 |
| 5 or more | 11 | 66 | 3 | 4.5 | 44 | 260 | 64 | 24.6 | 23 | 132 | 26 | 19.7 | 12 | 70 | 26 | 37.1 | 9 | 46 | 27 | 58.6 |

TABLE IV

NUMBER OF SECONDARY CASES PER PRIMARY CASE IN FAMILIES WITH 1, 2, 3, 4, AND 5 OR MORE SUSCEPTIBLE CONTACTS
SCARLET FEVER, MUMPS, CHICKEN POX, WHOOPING COUGH AND MEASLES

| No. susceptibles in family | Scarlet Fever | | | Mumps | | | Chicken Pox | | | Whooping Cough | | | Measles | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Primary cases | Secondary cases | Aver. No. Secondary cases per prim. case | Primary cases | Secondary cases | Aver. No. Secondary cases per prim. case | Primary cases | Secondary cases | Aver. No. Secondary cases per prim. case | Primary cases | Secondary cases | Aver. No. Secondary cases per prim. case | Primary cases | Secondary cases | Aver. No. Secondary cases per prim. case |
| 1 | 10 | 0 | 0 | 290 | 54 | 0.28 | 258 | 122 | 0.47 | 206 | 108 | 0.52 | 496 | 255 | 0.51 |
| 2 | 23 | 0 | 0 | 258 | 129 | 0.50 | 170 | 135 | 0.79 | 118 | 95 | 0.80 | 195 | 184 | 0.94 |
| 3 | 20 | 4 | 0.20 | 152 | 130 | 0.85 | 88 | 102 | 1.16 | 50 | 46 | 0.92 | 74 | 109 | 1.50 |
| 4 | 17 | 8 | 0.47 | 62 | 70 | 1.12 | 33 | 52 | 1.57 | 16 | 22 | 1.37 | 26 | 60 | 2.30 |
| 5 or more | 11 | 3 | 0.27 | 44 | 64 | 1.45 | 23 | 26 | 1.13 | 12 | 26 | 2.16 | 9 | 27 | 3.00 |

exposed in the home, 2,023 developed measles, a secondary attack rate of 66.1. He does not state whether primary cases and only those developing the disease after the minimum incubation period were included among the 2,023 cases. Table II shows the above rates, both the original and those corrected, to correspond as closely as possible to the group studied by us.

In order to determine if the secondary attack rate varied significantly in families with different numbers of suspectible persons, a grouping was made according to whether 1, 2, 3, 4, and 5 or more susceptibles were exposed. The rates were computed for the different diseases by groups and are shown in Table III. While the numbers are not sufficiently large in some of these groups to warrant drawing definite conclusions, it is evident that there is no fixed relationship between the secondary attack rates and the number of susceptible family contacts.

While the secondary attack rates do not increase or decrease regularly according to the number of susceptible contacts, Table IV shows that secondary cases resulting from each primary case shows a steady increase from the 1 susceptible contact group to the 5 or more groups for each disease except scarlet fever and chicken pox, and in the latter it is true except for the group of 5 or more contacts. The smallest increase was in scarlet fever from 0.20 secondary cases per primary case in the group with 3 susceptible contacts to 0.47 in the group with 4 susceptibles. The greatest increase was in measles from 0.51 secondary cases per primary case in the 1 contact group to 3.0 in the 5 or more.

SUMMARY

1. Measles has the highest infectivity of any of the diseases studied.

2. The secondary attack rates among susceptibles of any of the diseases studied do not vary uniformly according to the number exposed in the family.

3. The average number of secondary cases per primary case increases as the number of susceptible contacts increases, but there is great variation among the different diseases.

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# Silicosis*
# A Study of 106 Pottery Workers

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PNEUMOCONIOSIS, a "disease due to breathing air containing silica ($SiO_2$) is characterized anatomically by generalized fibrotic changes and miliary nodulation in both lungs, clinically by shortness of breath, decreased chest expansion, lessened capacity for work, increased susceptibility to tuberculosis," [1] and roentgenographically by diffuse nodular or confluent pulmonary shadows, increase in peribronchial and hilar densities and decreased excursion of the diaphragm.

## INCIDENCE

Hippocrates described the breathing difficulty of metal-diggers. Agricola,[2] in 1557, wrote: "When the dust is very corrosive it ulcerates the lungs and produces consumption. Hence it is that in the Carpathian Mountains there are women who have married 7 husbands, all of whom this dreadful disease has brought to an early grave." Löhneiss,[2] in 1690, recorded that ". . . the dust and stone fall upon the lungs, the men have lung disease, breathe with difficulty, and at last have consumption." Ramazzini [3] first described the grating sound produced by cutting the lung tissues of stone and coal workers early in the 18th century.

Although observed in every industry where silica-laden air is encountered, pneumoconiosis was not scheduled as a compensable occupational disease until 1910 when New Zealand included it under the Workmen's Compensation Act and almost immediately rescinded the action (Sayers [2]). Interstitial pneumonia, or miners' phthisis, was recognized among the zinc and lead miners of Utah and Nevada in the same year. It had been known in the Transvaal in 1899. Today silicosis ranks with the dermatitides as one of the most important occupational diseases which McCord [4] aptly has termed "Medicine's Unclaimed Province." It is estimated by Lanza and Vane [5] that in the United States fully ½ million workers are exposed to silica dust in the chief mining, quarrying, rock-drilling, clay products, and associated manufacturing industries. Pneumatic tools and natural stone grinding wheels have made silicosis world-wide.[6]

An acute form of the disease occurs with symptoms manifested as early as 3 years after initial exposure to mixtures of silica and soap alkalis. Such cases have been described in soap powder grinders and packers by Chapman [7] and MacDonald,[7] in scouring powder workers by Kilgore,[9] in sand blasters by Foord,[10] and others, and in lens grinders by Russell.[11] Death usually is from terminal pneumonia or tuberculosis.

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A more gradual development of silicosis was found by Clark [12] in two-thirds of a group of carborundum and carbide workers with average occupation period of 10 years. Lawson, Jackson and Gardner [13] found 9 of 17 iron miners with exposure of 3 to 8 years, to have died during the following 21 years. The remainder showed rapidly progressing fibrosis. Lanza [14] reported the average age at death of zinc miners in Missouri as 36 years and the life expectancy of iron ore workers as 9.6 years. In 1900 Murray reported an asbestos worker who was the only living survivor of 11 men entering that industry 10 years previously. Asbestos dust enters the lungs as a silicate rather than as the oxide of silica.

Characteristically pneumoconiosis develops insidiously and symptoms are latent. Thus Britton and Head [15] saw a granite worker and a knife grinder each with only 4 months exposure who first developed symptoms 23 and 14 years later respectively.

In a comprehensive review, Pancoast and Pendergrass [16] found fibrosis in 74 per cent of 495 sandstone workers, and in 57 per cent of 208 rock drillers with average exposure of 21 years. Fifteen per cent of those affected had third stage silicosis. Fifteen of 20 cement plant workers exposed over 7 years had slight fibrosis. Orr [16] reported second stage silicosis in a buck-and-wing dancer who for 25 years had scattered sand on the stage before each performance. Mills [18] found advanced fibrosis at autopsy on a man who had worked in an asbestos mine 32 years previously for a short period only. In hard coal miners with average exposure of 11 years, Tattersall [19] found silicosis developing slowly and insidiously. In Welsh coal miners after 20 years' service, Cummins [20] found the lungs to contain large amounts of both rock and coal dust. In his experience silicosis appeared long before tuberculosis developed and coal miners were not very susceptible to the latter. McFarland,[21] and Russell, *et al.*,[22] found silicosis to be almost universal in granite workers (Barre, Vt.) with an unusual susceptibility to tuberculosis after 20 years' exposure. Head and Rosenblum [23] found 3.7 per cent of 500 males admitted consecutively to Cook County Tuberculosis Hospital to have tuberculosilicosis.

### PATHOGENESIS AND PATHOLOGY

The crystalline and amorphous silica compounds ($SiO_2$) comprising rock crystal, quartz, quartzite, flint and sandstone, are the chief producers of silicosis. Lemon and Higgins [24] emphasize the point that more than 10 million particles of silica per cu. ft. of air and a size of less than 10 microns are essential to any appreciable silicosis hazard. As high as 92 million particles have been determined.

Many observers (Belt,[25] Lemon and Higgins,[24] Russell,[22] Mavrogordato,[16] Pancoast and Pendergrass,[16] *et al.*) believe that following inhalation the particles of silica are engulfed by macrophages or "dust cells" which enter and block the lymph spaces. Mavrogordato [16] concludes that silica kills the "dust cells" and dissolves in the alkaline tissue juices forming a poisonous hydrosol jell ($Si(OH)_4$). Gye and Kettle [26] have shown experimentally that colloidal silica when injected into animals is poisonous. Fibroblastosis is stimulated and a fibrotic nodule is formed about the dead macrophages. The center of the nodule heals and is free from silica; the periphery grows and abounds in silica particles. Confluence of these nodules produces a massive fibrosis in which are found nests of silica with contiguous healed lesions some of which show 1 mm. or less areas of degeneration. Few believe, with Arntzen,[26] that the physical characteristics (sharp edges) of the silica

particles are of much importance, although the presence of alkalis, concomitant infections, and rapid breathing undoubtedly predispose to silicosis.

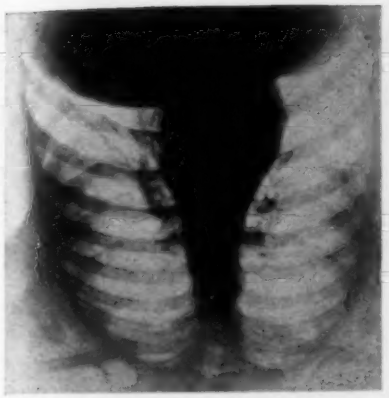
McNally [27] reminds us that silica is a normal constituent of the human body but concludes that any lung containing more than 2 mg. of $SiO_2$ per gm. has had undue exposure to a dusty atmosphere. He found an average of 1.13 mg. of silica per gm. of dry lung in 21 samples from non-silicotic persons and reported from 2.4 to 26.0 mg. of $SiO_2$ per gm. of dried lung in workers in various dusty trades. Stone and granite cutters showed the higher amounts. Church [27] found the ash of potters' lungs to contain 47.78 per cent silica. In a study of 15 tunnel rock drillers and sand blasters and pulverizers, 12 of whom died of pulmonary infections within 9 to 18 months after short exposures, Gardner [28] found almost universally (all but one) microscopic but not gross evidence of silicosis. Sixty-one per cent of the bronchial lymph nodes were silicotic. The nodules ranged from 0.3 to 0.4 mm. in diameter as compared with 3.0 to 4.0 mm. sizes found in hard rock and lead miners with many years' exposure. A maximum of 3.1 per cent silica content in the lungs was found.

### SYMPTOMS

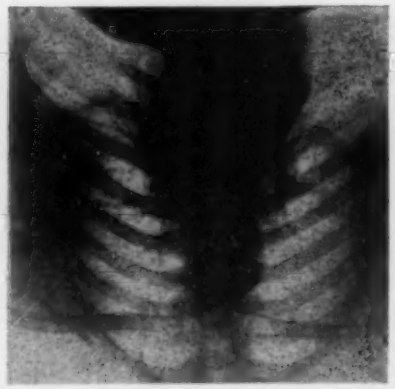
As Russell [22] points out, dyspnea, the earliest and the cardinal symptom, first sets in years after initial exposure and is progressive for years after exposure ceases. By the time shortness of breath is complained of, fibrosis already is moderately advanced, diminution in expansion and decrease in fremitus and resonance are demonstrable, and usually there is unproductive cough. Later the harsh breath sounds at the bases of the lungs become almost inaudible. Vital capacity is reduced. Cyanosis may be present. The anteroposterior diameter of the chest may be increased an inch. The patient, however, remains well nourished unless tuberculosis complicates the picture.

The earliest roentgenographic findings are increased density of the hilus shadows and trunk branches, perhaps indistinguishable from the changes resulting from repeated respiratory tract infections. A diffuse increase in linear markings follows and in second stage fibrosis nodulation, most pronounced in the central and basal fields, is observed. Confluence of these nodules produces a picture of consolidation in third stage fibrosis in which pleural adhesions also are almost constant. An important prognostic sign is the fluoroscopic observation of limited excursion of the diaphragm.[16]

In the differential diagnosis it must be remembered that other dusts than silica, as well as other diseases, produce changes in the structure of the lungs, as pointed out by Pancoast and Pendergrass.[29] The writer has observed 1 case of advanced fibrosis of the lungs in a laborer who for 10 years had cleaned soot and lamp black from the stand pipes and gas purifier of a gas plant. The size of the heart shadow and the prompt disappearance of the lung shadows with restored compensation betray the passive congestion of cardiac decompensation and coronary thrombosis. In bronchiectasis the cough is not unproductive, and dilated bronchial shadows are disclosed by roentgenograms. In the asthmatic chest the mottling is accentuated during and immediately after attacks. Metastatic mycotic infections closely simulate the nodular phase of silicosis but isolation of the fungus and the clinical signs clear up the diagnosis. Diagnosis oftentimes will have to depend on post-mortem determination of the silica content of the lung tissues and the presence or absence of the ulceration and progressive destruction characteristic of tuberculosis.[30]



*Case 35*—R. S., age 17 years, a caster for 3 years, had negative history and normal physical findings. X-rays (Plate I) revealed only slight peribronchial thickening and increased density in the hilar regions.



*Case 54*—M. P., age 32 years, a caster for 6 years, and coal miner for 10 years, had influenza 4 years previously, presented no symptoms and only slightly impaired resonance in the interscapular regions. X-rays (Plate II) showed moderate fibrosis, with diffuse peribronchial thickening and increased density of the hilar and perihilar areas.

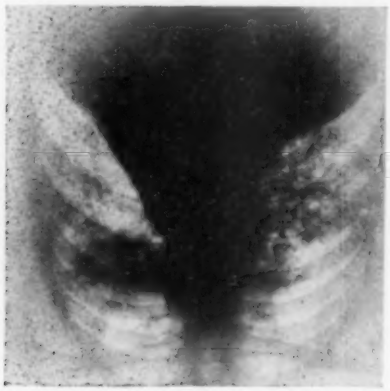
REPORT OF STUDY

In the plant studied, bathroom ware exclusively is manufactured. The clay mixture contains 20 per cent silica, 26 per cent feldspar, 27 per cent English china clay, 10 per cent domestic china clay, 11 per cent English ball clay, and 6 per cent finely ground pitcher or broken ware. The free silica content approximates 20–25 per cent.

The casting room constitutes the essential dust hazard. Each caster must shake silica dust into, and dry-sandpaper and brush off the dust from his own moulds. He is constantly inhaling silica dust and wears no mask. Occasionally the floor is sprinkled with water. There is no forced ventilation system. The fine dust which settles on the moulds while on the drying rack is blown off with a compressed air hose before the moulds go to the kilns. The dust produced by crushing and regrinding the ware broken during the first

*Case 17*—J. G., age 42 years, a caster for 10 years, had a negative history, symptoms and physical findings. X-rays (Plate III) revealed moderately advanced nodular fibrosis of the upper two-thirds of the lungs with dense hilar, perihilar and lower peribronchial shadows and diaphragmatic adhesions.

*Case 34*—J. S., age 48 years, a presser and caster for 27 years, had negative history, no symptoms, and had avoided inhaling dust when possible. Harsh breath sounds posteriorly, and a few coarse basal râles were heard. Fluoroscopy showed diaphragmatic adhesions. X-rays (Plate IV) revealed marked diffuse nodular fibrosis, with early massive confluence of the perihilar nodules.



*Case 56*—D. P., age 54 years, a potter for 21 years, had influenza 12, and right basal pleuritis 7 years previously. He had complained for 5 years of progressive shortness of breath and weakness, for 1½ years of dry cough, and for 2 weeks of inability to work as a foreman because of "smothering spells" (dyspnea), on the least exertion. He had lost 20 pounds in 2 years. Expansion of the chest was decreased; resonance was impaired in the interscapular and basal regions where dry coarse râles were heard. Breath sounds, harsh throughout, were distant at the bases. Fluoroscopy showed restricted excursion of the diaphragm. X-rays (Plate V) revealed advanced nodular fibrosis with massive confluence in the central and right basal fields.

This patient was awarded total and permanent disability pension by the Industrial Accident Commission of California.

*Case 25*—H. G., age 43 years, a caster for 12 years, had negative history, no symptoms or abnormal physical findings. X-rays (Plate VI) revealed marked diffuse nodular fibrosis with early massive confluence in the perihilar and inner basal fields. Death occurred 3 months later from respiratory failure 2 days after catching cold at his work. At autopsy were found healed apical (tuberculous) scars, dense, pleural adhesions, streaks of scar tissue scattered throughout both lungs, several small abscesses in the base of the left upper lobe, and scattered small bronchopneumonic consolidations.

firing, constitutes an additional hazard.

One hundred and six employees, exclusive of the office workers, were examined physically. In 58, with an average duration of exposure to silica-laden air of 7½ years, X-rays of the chest were taken. As indicated in Table I, 5, or 8.6 per cent, showed third stage or advanced fibrosis, the average duration of exposure being 16 years. Twenty-two, or 38 per cent, had second stage or moderate fibrosis. The remaining 31, or 53.4 per cent, showed only slight fibrosis. In 5 of these latter the changes were confined principally to the hila.

TABLE I

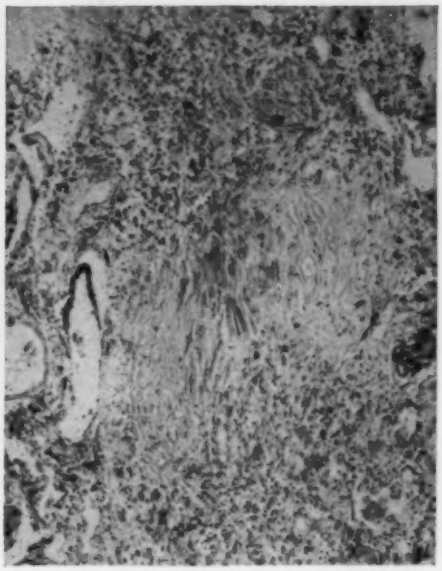
PNEUMOCONIOSIS (SILICOSIS)

Incidence in 58 of 106 Pottery Workers as Determined by X-rays of the Lungs (Quaintance–Morris)

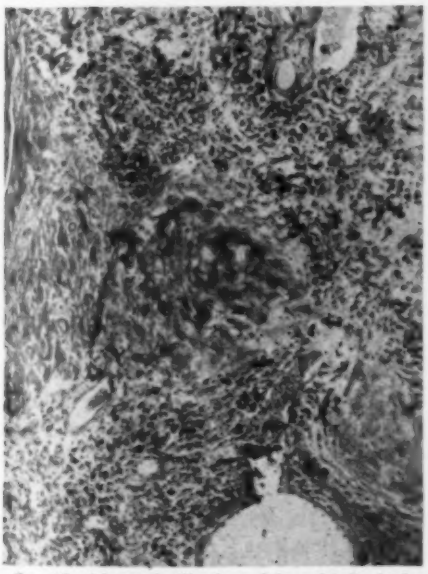
| *Stage of Silicosis* | | | *Number* | *Per cent* |
|---|---|---|---|---|
| Third * | Markedly advanced | 3 | 5 | 8.6 |
| | Moderately advanced | 2 | | |
| Second | Moderate | 22 | 22 | 38.0 |
| First | Slight | 26 | 31 | 53.4 |
| | Hilus only | 5 | | |
| | | Total | 58 | 100.0 |

* Average duration of exposure was 16 years in advanced group.

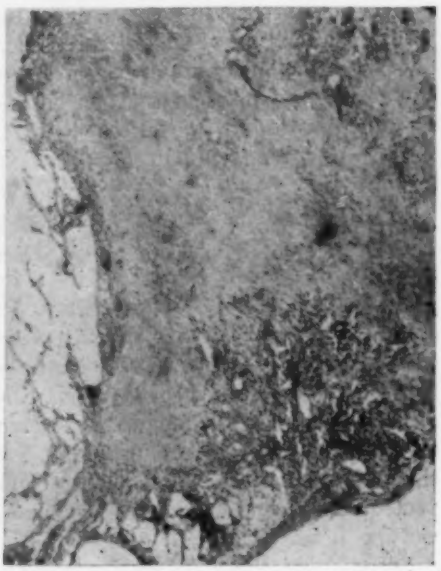
*Case 25*—Early peribronchial fibrosis with siliceous deposits at outer margin. Plate VII.



*Case 25*—Early nodular fibrosis with many fibroblasts and silica particles at periphery. Plate VIII.

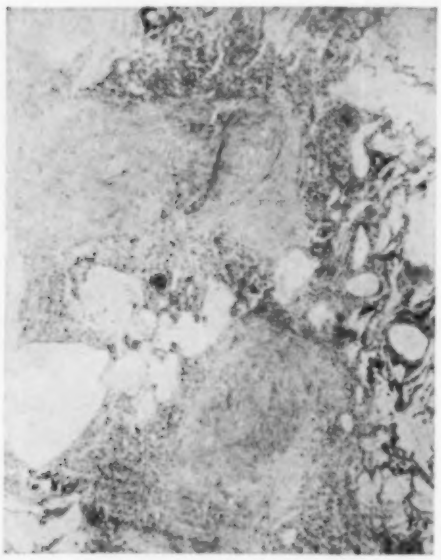


*Case 25*—Advanced silicotic nodules with beginning massive fibrosis. Note heavy peripheral siliceous deposits. Plate IX.



*Case 25*—Advanced, nodular silicosis, with marginal emphysema. Note sparsity of silica particles. Plate X.

Pancoast and Pendergrass [16] in a study of 58 potters, reported third stage silicosis in 36 per cent, second stage changes in 48 per cent and first stage silicosis in only 16 per cent. The average duration of exposure to dust in their series was not given, hence no accurate comparisons can be made.



*Case 25*—Contiguous, advanced silicotic nodules, with adjacent atelectasis and emphysema. Note absence of siliceous deposits. Plate XI.

### TREATMENT

Since the nature of silicosis precludes the possibility of arrest of the progressive fibrosis it is obvious that our efforts must be directed at prevention:

First, reduction of the concentration of silica dust in the inspired air is imperative. Adequate exhaust ventilation equipment will replace dusty with clean air. Wetting will eliminate dust in grinding and mining operations and settle the dust in blasting rooms before workers enter. Chilled iron shot can be substituted for sand in blasting. Enforced wearing of adequate respirators and helmets and proper provision for their supervision and maintenance will protect workmen in occupations where wetting is not feasible.

Second, selective employment will result in the transfer of the unfit to less hazardous occupations. Preëmployment examinations, including careful occupational history and record of past diseases, complete physical examination and X-rays of the chest, will make possible exclusion from hazardous occupations of those having had excessive exposure to silica dust (Sappington[31]) and will keep the tuberculous out of dusty trades. Todhunter and Dixon[32] suggest acquainting employees with the risks so that they may be educated in self-protection.

Progress is being made. Preëmployment and interval examinations by a board of 3 medical examiners are required in Australia, South Africa, Great Britain, and Ontario. Wisconsin, New York, Oklahoma, and Ontario (Sayers[33]) have attempted by legislation to limit the concentration of dust particles in the air which workmen must breathe to 10,000,000 per cu. ft.—the silicosis hazard threshold. If silicosis is to be controlled employers must be convinced that these preventive measures not only protect the health of their employees but are economically sound policies from the standpoint of industry.

### COMPENSABILITY

Pneumoconiosis is regarded universally as an occupational disease. It is recognized as cause for total and permanent disability pension. In California under recent decisions of the Appellate Court with concurrence of opinion by the Supreme Court, the "date of injury" with respect to operation of the "statute of limitations" is regarded as the time of onset of symptoms or that time when the presence of silicosis could reasonably have been determined by medical examination of the applicant. Where more than one compensation insurance carrier is concerned, the Industrial Accident Commission has been ordered to apportion the liability for compensation as the duration of employment or the periods of insurance coverage would indicate as being equitable.

### SUMMARY AND CONCLUSIONS

1. Inhalation of silica laden air results in pneumoconiosis, a progressive, incurable occupational disease of the lungs.

2. Fifty-eight cases are reported from the pottery industry in which the concentration of dust is low, silicosis develops slowly, symptoms are latent and appear many years after physical and X-ray signs of silicosis are demonstrable.

3. In advanced silicosis total and permanent disability for work, and a high susceptibility to pneumonia and tuberculosis are being recognized by the Industrial Accident Boards. Tuberculosis was not observed clinically in the group studied; pneumonia terminated 1 case.

4. Prevention of inhalation and reduction in concentration of silica laden air must receive more attention from the industries concerned, state elgislatures and the medical profession if silicosis is to be controlled.

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# League of Mental Hygiene in Brazil

THE National League of Mental Hygiene of Brazil, according to its recent report, has been giving most of its attention in the 10 years of its existence to a campaign against alcoholism, to physical examination of persons intending to marry, particularly men, and to child guidance work. The child guidance clinic established by the league is working with mentally retarded or otherwise mentally abnormal children in some of the public schools of Rio de Janeiro. Each child is given a thorough physical and psychological examination, and a written report of his condition with the necessary advice is presented to the parents. The results of this work are highly praised in Brazil.—*Archivos Brasileiros de Hygiene Mental,* Rio de Janeiro, 6, 4, 1933.

# Salmon Inspection*

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THE salmon has been a much appreciated article of food for untold centuries. Its bones have been found in the kitchen middens, or waste piles, of many forgotten peoples and some 10,000 years ago an unknown artist left us a record of this fish rather skillfully engraved on a piece of reindeer bone. This pictured fragment of bone, dug from the ashes in the floor of a cave in central France, shows that the salmon was valued by prehistoric men when the reindeer, following the retreat of the great glacial ice sheet, roamed throughout that section. Some of the earliest written records of the British Isles and Northern Europe have to do with fishing rights and "laws anent the saumon"; while early explorers along the shores of both the Atlantic and Pacific Oceans, north of the 40th parallel, found the natives depending largely upon this nutritious fish.

The salmon is an anadromous fish, that is, it requires both fresh and salt water for its complete life cycle. First seeing the light of day in some clear cool mountain streamlet or lake it spends a varying period of time in fresh water and then slips out into the sea, where food is more abundant, and growth is rapid. Arriving at maturity the salmon returns to fresh water to lay and fertilize its eggs, providing for the next generation. This spawning migration brings the fish together in great schools and makes their capture easier. In earlier times, this migration of mature salmon produced alternate periods of feast and famine, and various methods of preservation were developed to take advantage of nature's bounty and to ward off want as long as possible. Drying and smoking were probably the first preservative methods practised, and early records tell of extensive trafficking in salt salmon, while ice for the wider distribution of fresh salmon came into use about 1780. However, salmon did not become a world food, available in every important market, until after 1864 when the comparatively new method of food preservation known as canning was first employed.

From the Sacramento River in California, and a pack of a few hundred cases, the new industry spread to the Columbia River, Puget Sound, British Columbia, Alaska, Siberia, and Japan, and a yearly pack of some 9 million cases. A standard case for statistical purposes consists of 48 1-lb. cans or the equivalent, 96 ½-lb. cans or 192 ¼-lb. cans. The first small crudely built cannery on a scow has been replaced by hundreds, ranging in size from plants capable of canning a few hundred cases a day up to those that can pack 8,000 or 9,000. Some of these are poorly built and equipped, others are models of efficiency and design, splendidly equipped and scrupulously clean.

The salmon known to the artist caveman, to Izaak Walton, the enthusiastic angler, to Spenser, Dryden, Shakespeare,

* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

and other early British writers, was the Atlantic salmon, *Salmo salar*. This fish is still found in many of the rivers emptying into the Atlantic Ocean north of the 40th parallel and furnishes considerable sport for fishermen and a small amount of fresh and frozen salmon for an appreciative market. Practically none is canned. All of the canned salmon of commerce is supplied by the closely related Pacific salmons of which there are 5 species, all belonging to the genus *Oncorhynchus*. These are: *O. tschawytscha*, chinook, spring or king salmon; *O. nerka*, sockeye, red, or blueback salmon; *O. kisutch*, silver, coho or medium red salmon; *O. gorbuscha*, pink salmon; *O. keta*, chum or keta salmon. The steelhead, *Salmo gairdneri*, although a trout, is occasionally packed as a salmon but forms only 0.3 per cent of the world's pack.

The most striking biological difference between the Atlantic salmon and the Pacific salmons is that all of the latter die soon after spawning, while, with good fortune, the former return to salt water to recuperate and may live to spawn several times. In this respect the steelhead resembles the Atlantic salmon.

### DECOMPOSITION

The salmon, like other fish, being buoyed up by the water in which it swims, does not need as firm a structure as that required by land animals. Consequently it is more loosely put together with less connective tissue and while this contributes to a greater degree of digestibility of the flesh than is the case with meat, it also renders the fish more susceptible to damage by roughness in handling and to those decomposition changes leading to spoilage. It is imperative, therefore, that salmon should be handled with great care and canned, or otherwise preserved, as quickly as possible in order that deterioration may be kept at a minimum.

The term decomposition includes all of the changes that take place in the fish whereby it is broken down into its simpler substances. These may be due to enzymes secreted by the salmon itself, under control during the life of the fish but capable of digesting its tissues after death, or the changes may be due to the activities of bacteria. The muscle of the living salmon is practically always free from bacteria [1, 2] but on the outside and in the gills, mouth, and digestive tract of the feeding fish there are large numbers of them. When the salmon is well started on the spawning migration it ceases to feed, the digestive tract shrinks and in most cases becomes sterile.[2] Feeding salmon should be cleaned immediately after catching while those that have ceased feeding may be safely left in the round for a few hours.

Any conditions of handling or storing which tend to increase the activity of the enzymes or to introduce bacteria into the flesh should be eliminated or prevented to as great an extent as possible. Rough handling, bruising the flesh, even though it may not break the skin, will increase the activity of the enzymes, further loosening the tissues and preparing the way for a more rapid invasion of the bacteria. Any breaks in the protective skin naturally permit the entrance of bacteria into the flesh. Temperature has much to do with the rate of activity of both enzymes and bacteria, so that during warm weather fish must be handled more carefully and rapidly than during cool weather.

### DETERIORATION DURING SPAWNING MIGRATION

After the migrating adult salmon ceases to feed, it necessarily lives upon its stored up fat and protein. Work done by Green [3] showed the effect of this spawning migration fast very strikingly in the disappearance of fat globules from within the muscle fibers

and changes in the fibers themselves. Certain Russian scientists [4] made a very thorough study of the changes that took place in the Amur River chum salmon between the time some of them were caught in the open sea just as the migration started and those taken on the spawning beds as they were perishing. Some 97 to 98 per cent of the fat and 57 per cent of the protein was expended. Unpublished work by Shostrom (of this laboratory) shows a change in the average fat content of the pink salmon caught in one trap in Southeastern Alaska during the fishing season of 1930 from a maximum of 9.88 per cent to a minimum of 4.30 per cent. These fish were still in salt water with a long journey to the spawning beds ahead of them. There are other changes such as a softening of the texture, a bleaching out of the color of the flesh, and an abnormal coloring of the skin that take place during the migration. Naturally those fish taken early in the migration are superior in quality to those taken later.

Changes that have taken place in the fish due to deterioration during the spawning migration, to rough handling or to decomposition, all leave their marks on the canned product which can be detected and interpreted by the trained examiner.

### INSPECTION OF CANNED SALMON

The more progressive canneries make a practice of examining some of the cans from each day's pack in order to correct any faults that may have crept into their methods, and those following this practice conscientiously seldom have trouble with their pack later on.

After the salmon pack is put up, it may be examined by one or more of several different agencies or organizations; governmental, trade associations, buyer or buyer's representatives. Of these groups the first is usually interested only in the condition of the fish from the standpoint of freshness or in misbranding; the other groups are also interested in quality and in workmanship.

### GOVERNMENTAL INSPECTION

*United States*—The federal government has, for many years, taken a very active interest in canned salmon. The Food and Drugs Act of 1906, as amended, established very definite and rather sweeping principles for the regulation of interstate traffic in foods and drugs. Some 80 per cent of the total American pack of canned salmon is produced in Alaska, a territory. Most of that produced in the coast states of Washington, Oregon, and California is shipped elsewhere for consumption and so becomes subject to federal regulation.

Government inspectors visit as many of the salmon canneries in Alaska and in the states during the packing season as their limited personnel and the great distances to be covered permit. They also draw samples from some of the parcels in interstate shipment for examination, which is confined for the most part to a determination as to whether any of the provisions of the Act have been violated.

Section 7 of the Act states that a food shall be considered adulterated "if it consists in whole or in part, of a filthy, decomposed, or putrid animal or vegetable substance." Literally construed this provision is very sweeping. The misbranding provisions of the Act require that none of the statements made on the label shall be "false or misleading." The Act does not require that the species of salmon be named on the label but the Code for the Canned Salmon Industry makes this mandatory. The net weight amendment of 1913 provides that all foods in package form shall bear a clear statement of the net contents and a regulation issued under the McNary-Mapes amendment of 1930

requires that the can be reasonably well filled.

The states and many municipalities have food laws and regulations, largely modeled upon those of the federal government.

*Canada*—The Dominion Government passed an Act in 1907 known briefly as the "Meat and Canned Foods Act." An Order in Council of April 4, 1932, created a Board of Inspection whose duty it is to examine all canned salmon packed within the Dominion. This board is composed of 3 men, trained in the examination of canned salmon, who inspect and report upon the quality and condition of the various parcels. If found "to be fresh, firm, well packed, and in good merchantable condition," it is approved and a certificate to that effect issued to the canner. Canned salmon found "to be sound, wholesome, and fit for human food," but failing in some respect to quality for a certificate is marked "Second Quality." This legend is embossed on can ends which are clinched on over the original end or ends, so as to conceal the word "Canada" usually embossed thereon. Canned salmon found "not to be sound, wholesome, and fit for human food," is confiscated and either destroyed or used by the Department of Fisheries in the feeding of small fish at the hatcheries and rearing ponds.

The law also requires the code marking of all cans in such a way as to show the species of salmon, the date of canning, and the name of the packer. The "first letter of the code marking shall represent the species as follows: Sockeye S, Pinks P, Cohoes C, Chums K, Springs T, Bluebacks B, Steelhead trout H." (The blueback in Canada is an early run of coho instead of a red salmon as it is on the Columbia River.)

*Japan*.—The Japanese Government maintains a supervision over the quality of canned salmon intended for export, and under its auspices the Japanese Salmon Canners Association, to which all salmon canners must belong, was organized in 1931. The association at its 8 inspection stations conducts a strict inspection in accordance with regulations issued by the Ministry of Agriculture and Forestry. Inspection is made of the outward appearance of cans and cases and of the contents.

The regulation further stipulates that after the examination, canned salmon is to be classified into 3 classes, namely, Passed, Non-exportable, and Rejected. The passed goods are further classified into 3 grades: First Class, or Choice; Second Class, or Standard; and Third Class. The first 2 classes may be exported to any part of the world, the third used only in Japan and a few specified countries. Rejected goods may not be sold anywhere.

### EXAMINATION BY BUYERS OR BUYERS' REPRESENTATIVES

From the beginning of the industry it has been customary for the prospective buyer to demand samples for his own examination. While this is still done in some instances, it has become general practice for the buyer to rely upon the examination of some third party. Large buyers frequently have their representatives, living in the principal centers of production, who know what the buyer desires and make the examinations for him, selecting for shipment such parcels as meet his requirements. Smaller buyers, whose volume of business does not warrant a special representative, frequently rely upon the experience and judgment of public examiners for an impartial inspection of parcels in which they may be interested.

### EXAMINATION BY TRADE ASSOCIATION

While the actual examination of canned salmon in Japan is performed by representatives of their trade associa-

tion, it is made under government supervision and is, therefore, virtually a government examination. The Canned Salmon Section of the Canadian Manufacturers Association is a voluntary organization and does not include the examination of canned salmon among its regular activities. The Association of Pacific Fisheries and the Northwest Salmon Canners Association are voluntary American trade associations having offices in Seattle and comprise within their membership practically all the salmon canners operating in the United States and Alaska. They do not, however, include the inspection of canned salmon among their regular activities.

The National Canners Association was incorporated in 1907, and in 1919 established an office and laboratory in Seattle, later known as the Northwest Branch. An office and general laboratory are maintained at 826 Skinner Building, and a canned salmon laboratory at Pier 40. The laboratory has spent much of its time in the examination of canned salmon. One of its first activities was a comprehensive study[5] of the changes that take place in salmon during the early stages of decomposition. Salmon of each of the 5 species were taken alive from traps and held under cannery conditions, as far as possible, for several days. Each day some of the fish were subjected to detailed physical, chemical, and bacteriological tests, and then canned. Afterward the canned product was carefully examined physically, chemically, and bacteriologically, and the results were correlated, so far as possible, with the condition of the fish before canning. It was found that the quality of the fish as caught and the conditions and methods of handling were reflected very closely in the quality and condition of the canned product. Various other experimental packs have been made since to clear up certain points in the correlation between the raw fish and the canned product.

Partly as the result of these studies, partly from the rather complete records of the examination of several thousand cans of salmon, and partly from the experience of several commercial examiners, a systematic method for examination was evolved.[6] This has been modified slightly from time to time, but in principle has not been greatly changed. While the commercial examiners and buyers' representatives do not follow this method in detail, they do look for many of the same significant factors of quality and condition, and it is apparent that a considerable degree of uniformity in the method of examining has been attained. This uniformity is being promoted most actively, perhaps, through the Annual Canned Salmon Cutting Demonstrations where samples of all species, and from all American packing districts, are opened and judged by committees made up of men actively engaged in the production and merchandizing of canned salmon. It is, of course, highly desirable that all persons employed in this inspection should use the same general terms in speaking of the significant factors and should evaluate these factors on a fairly uniform basis.

### EXAMINATION OF CANNED SALMON

The method in use by this laboratory will be outlined in order to bring out the significant points to be considered. Canned salmon is shipped, warehoused, bought and sold in blocks or parcels, varying in size from a few cases up to 50,000 or even more. The first step in the examination of a parcel is to obtain a very complete description of it, including the packer, cannery, species, brand, size and kind of can, can or code marks, number of cases, location in warehouse, etc. Careful attention to detail is frequently of great importance.

### SAMPLING

An attempt is made to draw as representative a sample as possible, including all the different code marks to be found in the parcel. The sampling schedule calls for 12 cans (1 from each of 12 cases) in a parcel of 100 cases, 36 cans from 1,000 cases, 144 cans from 10,000 cases, etc. While the sample cans are being drawn the general condition of the parcel is also noted.

### EXAMINATION

The examination of the sample cans covers:

1. Bacteriological and microscopical examination
2. Workmanship in packing
3. Quality of the fish when caught
4. Condition of the fish when packed
5. Chemical examination

Routine examination does not include the first and fifth of these divisions. Under special conditions these are sometimes employed however.

### BACTERIOLOGICAL AND MICROSCOPICAL EXAMINATION

By the use of appropriate culture media, tests are made to ascertain if the cook used was sufficient. If spoilage has occurred in the parcel a bacteriological examination is desirable. By a direct microscopic examination and bacteria count, considerable information can be gained as to the condition of the fish when canned. The microscope has been used also to aid in the identification of the species of salmon through a study of the scales, which carry a record of the age of the fish when caught.

### WORKMANSHIP IN PACKING

Under this head are included the evidences of all those fishing and cannery operations the effect of which may be observed in the canned product. Bruises and pugh [one-tined fork] marks, evidences of rough handling, are shown by blood clots and discolored areas. The fish should be clean and free from all waste parts. It should be well placed in the can and consist of only 2 or 3 pieces. A proper cook is indicated by a rather soft and friable bone. A definite slightly salty taste is required to bring out the full flavor of the fish. Cans must be reasonably well filled, and the net weight equal to the amount stated on the label. They should possess a vacuum at sea level of 6 or 8 inches of mercury, as shown by a suitable gauge, in order to maintain a normal appearance if shipped to a warm climate or a high altitude. Cans having little or no vacuum may become "springers or swells," and thus unmerchantable, under these conditions.

### QUALITY OF FISH WHEN CAUGHT

Each of the 5 species may range from very good to very poor when caught. This difference is due at times to a variation in the available food supply in the different sections, but usually, however, to the stage of the spawning migration. The examiner must take into account the characteristics of the different species in judging the color and texture of the flesh and the amount of free oil in the can. The oil is measured in cubic centimeters and compared with a standard chart based on the examination of some 79,000 separate cans in 1933. During the spawning migration the normal color gradually fades out, the texture softens, and the fat, from which the free oil comes, grows less.

### CONDITION OF THE FISH WHEN CANNED

Under this head are included all the factors to be observed in a can which are noticeably influenced by the condition of the fish as concerns freshness, or lack of it, when canned. Fish are very delicate, easy to injure, and decompose very easily. Many opportunities for spoilage between the catching and the canning exist, and the excellent

condition in which the bulk of canned salmon reaches the market speaks well for the care and resourcefulness of the average packer. Much can be learned of the condition of the fish when canned from the odor, texture, " reddening " of the flesh, " honeycombing," and turbidity of the liquid.

The odor is the most generally applied and, perhaps, the most reliable test for decomposition or lack of freshness. The sense of smell is not equally developed in all people, and considerable experience is required before one is qualified to pass upon the odor of canned salmon. An abnormal " feverish " or reddened, appearance of the flesh is sometimes found, and occasionally little pits in the flakes which may extend entirely through them (" honeycombing "). These conditions are both due to the activity of bacteria and are not common. The liquid is always somewhat turbid but decomposition increases the turbidity, and when advanced may cause a milky appearance.

### CHEMICAL EXAMINATION

In certain instances a chemical examination may be made of the contents of the can to detect the presence of certain products of decomposition, but such tests are slow and not adapted to routine analysis.

### APPLICATION OF THE ABOVE SYSTEMATIC METHOD OF INSPECTION

While this method in substantially its present form has been used by this laboratory for some 12 years it was not until the 1933 packing season that it was tried out on a large scale. During that season the entire pack of some 46 different canning companies, totaling over 4,000,000 standard cases, was given a very thorough examination. There were about 2,300 separate parcels upon which separate written reports were made covering workmanship, quality, and condition. Over 93,000 individual cans were opened and the can and contents examined. Whenever a single tainted can was found additional samples were taken from the parcel, and if further bad cans were found amounting to as little as 2 per cent of those in the parcel or code mark affected, the parcel or code was " reconditioned " by removing all of the stale or tainted cans. To do this each can in the parcel or code was opened and the bad ones destroyed. The good cans were closed and recooked. Only a few lots were found to contain bad salmon. Two small lots were destroyed due to poor seams on the end of the cans.

On the whole, the salmon pack for 1933 was found to be very satisfactory. This inspection was, perhaps, the most extensive ever carried out on any single food commodity. The packers cooperated whole heartedly and an even larger number have requested an examination of their entire 1934 pack, so that it is estimated that some 6,000,000 cases will be inspected by the laboratory this year.

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# EDITORIAL SECTION

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## CULTURES IN THE DIAGNOSIS OF TUBERCULOSIS

FROM England comes a report,[1] giving methods which if proved to be practical in general use, as they seem to be, should revolutionize the diagnosis of various forms of tuberculosis as far as the finding of the specific organism goes. The method originated in the Tuberculosis Department of the State Serum Institute, Copenhagen, at the hands of K. A. Jensen, who devised the culture medium which has been so successful. It is apparently a modification of that used by Lowenstein in his remarkable work.

The English report is the result of about a year of work. The writer, as Assistant Medical Superintendent of the Wooley Sanatorium, has had abundant opportunities to obtain material. She attributes her success not only to the culture medium but to the use of the screw-topped bottle in place of the customary test tube.

From the middle of September, 1933, to the middle of February, 1934, she has obtained positive cultures from some 250 specimens which were microscopically "T. B. Negative." The majority of these were sputum, but pus, urine, cerebrospinal fluid, and pleural fluid also gave positive cultures, often luxuriant. Apparently there is no more difficulty in cultivating tubercle bacilli of bovine type than those of human, though the characteristics are entirely different. It is said, however, that the human bacillus passes through a stage in which it is not distinguishable from the bovine. In profuse growths and prolonged incubation, the bovine colonies acquire color and lose their original smooth, shiny character.

In Denmark, Jensen at first confirmed his cultural findings as to type by the inoculation of rabbits, but later discontinued this when the growth was typically human, but continued it with bovine organisms. Holmes feels that with the growth obtained on her medium—a slight modification of Jensen's due to drugs furnished in England—and the screw-topped bottle, the differences are so clearly brought out that bovine cultures may be typed by this method alone, as in only 2 or 3 per cent is any difficulty found.

The author gives directions for making the culture medium, but believes that

there should be a central supply in each district for the use of general hospitals, sanatoria, tuberculosis clinics, etc. In addition to positive findings in doubtful cases, she believes that there is great value from the administrative standpoint, especially in regard to the infectivity or otherwise of tuberculous patients. Since positive cultures have been obtained in over 50 per cent of so-called "negative" sputa, she holds that such persons are at least as often as not infective to others.

Another point of importance concerns the transference of types of infection from one patient to another. The case is cited of a woman who was placed in a three-bed cubicle with two pulmonary tuberculosis patients. The physician in charge finally classed her as non-tuberculous and moved her to a "clean" ward, where she developed pulmonary disease. Examinations of sputum obtained by stomach washing gave positive cultures of bovine tubercle bacilli. It was then found that one of the two other patients in the cubicle had bovine phthisis. This is apparently the first case of infection from man to man with the bovine tubercle bacillus.

If sanatoria and laboratories generally are able to duplicate these results, the origin of the infection in many obscure cases will be cleared up. We will have at hand a method which should aid greatly in the fight against the spread of tuberculosis.

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## BAILEY K. ASHFORD

IN 1898 when the American Army invaded the then Spanish Island of Puerto Rico there was in the Medical Corps of the Expeditionary Forces a lieutenant named Bailey K. Ashford. Ashford went through the campaign and after peace was concluded, remained in Puerto Rico off and on until his death on November 1, 1934.

His biography, *A Soldier in Science*,* gives a very interesting and readable account of his early years in Puerto Rico, and is one of the best descriptions of medical service in the World War which have yet been published. When he first went to Puerto Rico in 1898 the United States had very little conception of what we understand today as tropical medicine and it is largely due to the investigations of Ashford that the American medical profession and public became interested in diseases of the tropics. In his studies of hookworm anemia in Puerto Rico, Ashford threw light on a disease which previously had been shrouded in darkness. The disease had been studied in Egypt, in mines in Germany, and at the St. Gothard tunnel in Switzerland, but to the American public the subject was almost a closed book. Ashford's clear-cut demonstration of the hookworm as the cause of the anemia of Puerto Rico was so convincing that his leadership in tropical medicine in the Americas was established for all time. His investigations were followed by a program of control and, so far as possible, of eradication of the disease from the island to which he devoted his life. In traveling through Puerto Rico with Ashford it was amazing and gratifying to see how the people, not merely of the cities, but of the country districts, knew him personally, respected his unselfish interest in their welfare, regarding him in the light of a father and protector. Few medical men have ever exerted such a broad influence in improving health and social welfare in their communities as Ashford in Puerto Rico.

* For review see *A.J.P.H.*, Oct., 1934, p. 1085.

When the knowledge of his hookworm studies became available in the United States it acted as a stimulus to physicians on the mainland to review their own experiences with reference to this hitherto unknown disease with the astonishing result that studies patterned after Ashford's carried out in the southeastern states showed that we too had an unsuspected problem in tropical medicine within our own borders. The health departments and physicians in general in these regions took up the work throughout the South and it continues to this day, fortunately with the same success in its treatment and prevention that Ashford himself had experienced in the island.

During the many years of his life in Puerto Rico he acted as adviser to the Government in health matters. He was the main factor concerned in building up the School of Tropical Medicine in San Juan under the auspices of Columbia University and the Government of the island, and here he continued his work in the study of the anemias and of another troublesome disease of the tropics called sprue, to which he contributed many stimulating hypotheses regarding its etiology. The disease, as every one knows, is still more or less mysterious, but our interest in it and the progress which has been made toward its understanding is due in no small measure to the initiative of Ashford.

During his busy life in Puerto Rico he developed a considerable practice in general medicine, but more especially in surgery, and was highly esteemed by the Insular medical profession as a leader in medicine, as well as in public health.

In the death of Colonel Ashford the medical profession has lost a distinguished member and our fellow citizens of Puerto Rico have lost a lovable friend whose daily work was guided by a rare idealism. Dr. Ashford was a member of the A.P.H.A. from 1912 to 1924.

## SEWALL AND ANTITOXIN

THE Michigan Chapter of the Delta Omega public health society was concerned last year in reviving interest in a pioneer research of Dr. Henry Sewall. It had photostatic reproductions made of a paper published in the *Journal of Physiology*, of the year 1887, Vol. VIII, p. 203, which reports experiments on the preventive inoculation of rattle snake venom. A bronze plaque was presented to the University of Michigan commemorating the work.

The importance of this early work has been suggested in part by requests of European visitors to see the rooms and equipment used by Dr. Sewall in his experiments. Unfortunately nothing of the sort remains except in the memory of Dr. Sewall and one or two other men now living.

It has been suggested that these experiments and the following sentence from Dr. Sewall's paper may be viewed as the foundation upon which the great development of antitoxin has been erected.

> If immunity from the fatal effects of snake-bite can be secured in an animal by means of repeated inoculation with doses of the poison too small to produce ill effects, we may suspect that the same sort of resistance against germ-disease might follow the inoculation of the appropriate ptomaine, provided that it is through the products of their metabolism that bacteria produce their fatal effects.

Recent correspondence with Dr. Sewall resulted in several reactions of modesty and unconcern as to personal recognition, and this gives further evidence of his greatness as a scientist and as a man. "I had long ago made myself content with the thought that self-aggrandizement is the least worthy of all rewards of scientific research."

# PUBLIC HEALTH EDUCATION*

> *"Darwin was not above writing in a popular vein; neither was Tyndall or Huxley. Sir Humphrey Davy delivered numerous popular lectures on physics. Michael Farady gave demonstrations of his researches in electricity to lay audiences."* IAGO GALDSTON, in *Better Times*

**What We Noticed at Pasadena**—Further observations at the 1934 annual meeting will be welcome. A Section officer sends these informal notes:

The luncheon on health education materials showed us one thing at least—that we are all children who like toys. The profound moral is: simple things amuse and entertain and attract attention—don't be too high-brow if you want to get over health education.

It was nice to meet our co-laborers of the West Coast. Health education problems and effective programs are the same regardless of climate. Query: Wouldn't one of Dr. Peter's Chinese parades do more good in an American city than tons of pamphlets?

In Pasadena we at last had a chance to see what Routzahn's show looked like when it was all spread out where we could get at it. Did you notice there was someone studying his material all the time?

Dr. Tonney did a fine job on the radio program. Perhaps he should be made an honorary member of the Health Education Section.

Some of the radio speeches, by the way, could have benefitted with a little health education technic: splendid material, packed full of facts, excellent for a professional audience. Did they register with the populace?

Did you see the 17th Century English proclamation in the exhibit at the Huntington Library? There was one on the use of clean materials for filling pillows and mattresses. Baltimore passed a similar law a few weeks ago. Maybe this is why Huntington Williams felt that progress in health education was about as rapid as the erosion of the Grand Canyon.

When are we going to codify our knowledge of health education technic? Do we need a "Standard Methods of Health Education"?

**Institute Enrollment at Pasadena**—The Institute attendance originated geographically as follows:

*States and provinces:* Arizona, British Columbia, California, Colorado, Hawaii, Oregon, Utah, Washington . . . Alabama, Tennessee . . . Illinois, Michigan, Minnesota, Missouri, Wisconsin.

*California cities:* 34 cities from which came 1 registrant; 9 cities with 2 registrants, 4 cities with 3; 5 cities with 4; 2 cities with 5; 1 city with 8; 1 city with 9; San Diego, 12; Los Angeles, 30; with 21 unidentified.

**Prevent Cancer Among Mothers**—That "mothers' best protection against cancer of the cervix of the womb" is "the repair of all injuries and irritations following the birth of a child, and semi-annual pelvic examinations," was urged at Pasadena by Mrs. George F. Becker.*

Mrs. Becker, who presented her paper before the Public Health Education Section, is connected with Dr. Joseph Colt Bloodgood's Clinic and Diagnostic Center, Baltimore.

Mrs. Becker said that

> . . . if mortality from cancer of the cervix is to be decreased, the medical profession, the public health workers, the nursing

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

* Delivered before the Public Health Education Section, Sept. 4, 1934.

profession, the social worker, federations of women, state and local governments must all unite in a standard and continuous educational campaign.

Representatives of the local departments of health, with the aid of the social workers, and the Red Cross representatives, and with the governing authority, could provide clinics and literature for those mothers who cannot afford to have their own family physicians. Each community, no matter how small, has its clubs and societies, its Red Cross Chapters, its nursing organizations, and its county board of health. Through these units there should be no difficulty in conquering cancer of the cervix of the womb. The medical profession admits that the majority of people today do not reap the benefit of modern medicine because of fear, ignorance, and finances. Therefore, to meet the situation in each locality, city and state (and in some instances interstate), the endeavor to prevent cancer of the cervix should be carried on by the local organizations. These should include not only the medical group, but all women's organizations, men's organizations, schools and nurses' training schools.

**Selling the Health Department**—At Pasadena a paper was read by Kenneth W. Grimley,* director of the effective Bureau of Health Education and Publicity of the Jefferson County Board of Health, Birmingham, Ala.

Mr. Grimley's title was "The Technique of Selling the Health Department to the public." By omitting "Technique" the title would have been more accurate for Mr. Grimley concerned himself with the attitudes of those who do health department publicity and their professional preparation.

Mr. Grimley emphasized that

> . . . salesmanship demands that one believe. It requires that you who sell health really, honestly, believe in the possibility of preventive medicine; that public health is purchasable in truth. Superficially it may seem that further discussion of this point would be a waste of time. But actually many of those engaged in public health, including some disciples of public health education, have but a faint faith in its achievements and possibilities. We have all encountered health officials to whom the words *public health* convey nothing beyond the routine exercise of a petty police power in return for daily bread. Obviously such persons will not be adequate salesmen of the cause they represent. But of such we can expect but little, and thus need not fear disappointment.
>
> A much more serious tendency is that exhibited in recent years in higher and more exalted circles. There is present in the world leadership of thought today, a widespread attitude of more or less sterile, critical intellectualism. I would not deny that science itself is founded upon the attitude of challenge. But ships and shoes and wax for seals are not sold by intellectualism—by people anxious to appear commanding leaders of pure thought. When we have reached the point where whole sessions of this section are keyed to an attitude of questioning, critical limitations, doubt—we are trying to become just too scientific; too brilliantly intellectual. Things are sold, even public health, by an attitude of enthusiasm, of belief in their usefulness, their possibilities, their service to mankind. Regard with an air of superiority if you will, the verve of salesmanship. But if your mind is too splendid an instrument to dig ditches through the mud of ignorance, by all means withdraw from a defiling task. To sell public health, you must believe. You must believe in public health. You must believe in its high promise that some day infectious disease shall be banished from the earth. You must believe that some day, through its wise administration, the crushing load of diseases, ill health, physical handicap, premature death, shall be removed and all mankind shall enter into that heritage of life abundant which is the promise of civilization.

Then of course the publicity worker must know public health.

Public health publicity is rather obviously a union of two distinct skills, or technics, or sciences; that of public health on the one hand, and of publicity on the other. Both of these fields are the domain of experts, of professionally skilled craftsmen. The selection of personnel to perform the joint task of public health publicity is thus not easy. It is a task so difficult, in fact, that it is usually but half done; that is, a person is selected who is entirely competent in one branch, and rather sketchily equipped in the other.

Some public health officials in establishing

* Presented at a Joint Session of the Health Officers and Public Health Education Section, Sept. 5, 1934.

bureaus of divisions of public health publicity seem to have a feeling that of the two, a skill in publicity is more essential. Thus we find publicity services manned by individuals more or less well grounded in the field of publicity, but whose knowledge of public health is largely hearsay. . . .

. . . To sell a department of health is a much more involved procedure than the sale of a car or a washing machine.

Public health requires of its salesmen a knowledge of preventive medicine in the abstract; a knowledge of its traditions—of its glorious history of achievement—of the lives of that company of immortals in whose debt humanity will ever be. The glamour of the great victory against disease and death can never be told by one unfamiliar with its recorded pages, however well he may speak the common tongue.

To sell public health one must know it in the concrete example one is selling. A department of health—even a small one—is a complex, dynamic thing, with a history, with policies, achievements, defeats and victories, tasks done and undone, opportunities, unsolved problems, ideals to which men have patiently devoted lives.

**"Free" but Not Free**—Most references to "Free" in this department of the *Journal* mean that *single copies* are supplied to health workers *free,* or for return postage. A few readers are inclined to ask for copies for distribution to the public or to all teachers in a school. Insurance companies and commercial advertisers are about the only sources for securing free material in quantity. It seems hardly fair to expect local or state departments to supply material for distribution in other states or cities.

**Do We Need a Dictionary?**—Do we need a professional dictionary covering such terms as "principles," "technics," "philosophy," "fundamentals," and other rather common word symbols? Although they are accepted as having fairly precise meanings we had a feeling at Pasadena that the preciseness was in the mind of the speaker. Frequently it was doubtful that all the hearers read the same meaning into what they heard. May this lack of a common meaning be a cause of confusion and what seemed to be muddy thinking in discussions?

**Broadcasting in Manitoba**—The Manitoba Department of Health, at Winnipeg, is broadcasting three times a week via station CKY:

Tuesdays at 4:30 P.M. alternating with
Wednesdays at 12:30 P.M.
Fridays at 4:30 P.M.

In October and November, 1934, were presented on Tuesdays and Wednesdays two series on "Present Health Problems" and "Changing Health Needs," and "Child Health Problems" on Fridays.

"Mr. Average Citizen," a dramatic series in which Mr. Average Citizen "visits health agencies in Manitoba to find out their purpose and work" will come on Tuesdays and Wednesdays through January, February, and March. On Fridays in January a "woman's club representative" will report a series of visits to women's organizations, telling what they are doing to promote health.

Fridays in the following three months will be devoted to "My Body and How It Works," a series of stories for older children to supplement school lessons in physiology and hygiene. The stories have been adapted with permission of the authors, Dr. W. W. Peter, Dr. O. Reisse and Mrs. D. W. Baruch, and Harper and Brothers.

**What Have You?**—From time to time we mention individual requests for specific types of material. Your responses to such requests usually aid intensive efforts which seem worth while to help along. The editor of this department would value carbon copies of replies sent. We would like to learn what is available on special subjects and for special uses. Please answer, and please send us carbon copies.

The chairman of the Public Health Committee of the Central Branch of the Chicago Y.W.C.A. writes:

> In a recent study of the health of Y.W.C.A. members and students, it was found that the eight most prominent physical disabilities and conditions existing among these women were: thyroid, tonsils, dysmenorrhea, constipation, malnutrition, heart, foot trouble, and overweight.
>
> We are doing a good deal of study on these subjects and are making plans to put over a program of detection, prevention and care of these conditions to the hundreds of women reached by the Y.W.C.A. I am interested in getting hold of promotional material on these subjects, particularly posters, and I am appealing to you for information as to where to go.

Please address Marcella River, 4901 Ellis Ave., Chicago, Ill.

Please send copies of health education material to Dr. H. V. Tilak, Bombay Presidency Baby and Health Week Assn., DeLisle Road, Bombay (11), India.

Journals of health agencies are invited by Jewish National and University Library, Jerusalem, Palestine.

**Use Your Own Special Audience**—Dr. William P. Brown has been writing on public health for a Catholic magazine or two. There he has a ready-made audience, more or less willing to read about public health when presented in the special setting to which this audience is familiar.

Thus Dr. Brown points the way to a simple extra bit of service open to practically all health workers and teachers. Connection with a lodge or club, church or educational group, or any one of our countless centers or—those having like interests, offers a medium for the health worker. The organs of these groups may have local or state, or even national circulation.

Health councils as well as individuals might well try to interest health workers in this idea.

For samples of what Dr. Brown has written address him in care of State Education Dept., Albany, N. Y.

**The Study of Public Opinion**—Princeton University Press, Princeton, N. J., has issued "A Reference Guide to the Study of Public Opinion," by Professor Harwood L. Childs, with a preface by Edward L. Bernays. 105 pages. *$2.00.*

There are several hundred reading references classified under main headings and numerous sub-headings. Each section opens with an introductory statement, and closes with "topics for further investigation."

Some of the chapter topics: "Leaders and managers of opinion" (biographical); "The development of organized opinion management"; "The technique of organizing pressure groups"; "Instruments of opinion dissemination"; "What is public opinion?" It is in no sense a manual on methods.

For most topics there is much more material than any one is likely to use, but it should be understood, as is pointed out by the author, that the references are uneven in value.

Under "The Press" there is no mention of *Editor and Publisher*, chief journal of the newspaper press. Critical magazine articles are almost all omitted; and the section on "The Trade and Periodical Press" is rather absurd in its inadequacy. "Present Status of Radio" overlooks magazine discussions in the past few years, and omits mention of National Committee on Radio in Education, probably the most important single source of critical material.

"Studies of Technique in Particular Fields" seems less inclusive than its general heading of "Strategy and Technique of Opinion Management." At least there are almost no critical or questioning references.

There is no sub-heading for "health," "social welfare," or "social work," but

under "Business" along with commercial advertising we find listed two books by the Routzahns!

Notwithstanding what is not there, the book is well worth having. It might be brought to the attention of various local groups having program sessions or discussion meetings.

**What Editors Say**—Many editorials on health and other welfare topics merit a wider audience and a longer life than comes with their original publication.

Some 46 editorials have been collected in "Editorial Opinion and Social Work," a 17 page pamphlet. Health is the subject of editorials from *Collier's*, New York *Times*, Honolulu *Star Bulletin*, Miamisburg, Ohio, *News*, and Springfield, Ill., *State Journal*. There are quotable sentences for use in your own copy. Editorial writers would be interested in seeing what others have written.

Issued by Social Work Publicity Council, 130 East 22d St., New York, N. Y. *25 cents;* special price for quantity.

**Health Education in New York City**—One of the few examples of community-wide consideration of health education is promised by the reorganized Health Education Section of the Welfare Council of New York City. The executive committee: D. B. Armstrong, M.D., Mrs. K. Z. Whipple, Savel Zimand, C. F. Bolduan, M.D., Iago Galdston, M.D., G. M. Galloway, G. T. Palmer, D.P.H., Marguerite A. Wales.

Jane M. Hoey is secretary of the Health Division, Welfare Council, and Valeria McDermott is Assistant Secretary.

**What Is In Hygeia, November, 1934**—Among the topics presented:

Foot twisting and faith healing . . . Tuberculosis and the kings of France . . . The story of local anesthesia . . . Preventing arthritis . . . The parent, the dentist and the child . . . Prenatal care . . . Dainties for the diabetic . . . The myth of the average child . . . The body louse . . . Poisoning in industry . . . The doctors of Dickens . . . Selling vegetables to the family . . . The a b c of proper brushing . . . If your child is overweight . . . What you should know about eye-glasses . . . Dental dens (quacks) . . . Solving health educational problems . . . New books on health . . . Questions and answers.

NEW OR RENEWED

*Bulletin*, Mass. School Dental Assn., issued by Massachusetts Dept. of Public Health, Boston, Mass.

The *Monthly Bulletin*, Indiana Division of Public Health, Indianapolis, has been revived under editorship of Thurman B. Rice.

TEACHING OR TALKING

Health and education agencies through the New Jersey State Normal School at Newark are offering an accredited course in "Principles of Dental Health Education," by Dr. J. M. Wisan.

The Junior League conducted a Welfare Conference in Minneapolis, Oct. 15–19, 1934. Public Health was represented on the program by several round tables, addresses and field trips.

Three institutes on health education in secondary schools were conducted this fall by Massachusetts Tuberculosis League in coöperation with the State Dept. of Public Health.

WHAT AND HOW

"The Educational Objective of Public Health Nursing," by M. Lindeburgh. *Canadian Public Health Journal*, 105 Bond St., Toronto 2, Ontario. *35 cents*. "How shall we educate or prepare the public health nurse that she in turn may educate the public?"

"Interpreting Health Education," by Ruth Ware, discusses Y.W.C.A. services in relation to association and community chest budgeting. It emphasizes

interpretation of the program to board members, association members, and "the community at large." *Womans' Press*, 600 Lexington Ave., New York, N. Y. Oct., 1934. *20 cents.*

A sampling of health articles in *Red Cross Courier:* "How Safety Came to Civil Works"; "Adequate Schools Aid Development of Water Program at Home"; "Hospital Guild Sponsors Home Hygiene"; "Folk Lore Treatments Disappear When Case Worker Talks on First Aid"; "The Schoolhouse on the Hill" (country home hygiene class).

TO HAVE OR TO USE

A feature of the scientific exhibits at the American Medical Assn. and the American Public Health Assn. conventions was a series of charts reproduced in a pamphlet entitled "Progress in Public Health Since 1900," with an introduction by Dr. L. I. Dublin. Some titles: "Diphtheria a vanishing disease"; "Longer life for more people"; "The mounting death toll from cancer"; "Reducing the hazards of early infancy." Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y. 12 pages. *Free.*

An appeal for the support of private health agencies was issued Nov. 1 by Col. Theodore Roosevelt, president of the National Health Council. Although given out for immediate effect in the fall Mobilization for Human Needs the statement should be useful locally throughout 1934–1935 in money raising efforts. Address the Council at 50 West 50th St., New York, N. Y. *Free.*

"Children's Bureau and Other Publications Relating to Children." Price list 71 of government publications. Supt. of Documents, Washington, D. C. 15 pages. *Free.*

"A Directory of Organizations in the Field of Public Administration" is a 2d edition. Describes briefly 500 national organizations, public and private, including health and others of interest to health workers, and many others. There are listed more than 1,400 state, regional and Canadian associations. 192 pages; paper covers. *$1.00.* Public Administration Service, 850 East 58th St., Chicago, Ill.

"The Need for a More Adequate Program of Maternal Care," by F. C. Rothert, M.D. Reprint. *Public Health Nursing*, 50 West 50th St., New York, N. Y. *10 cents.*

"The School and Tuberculosis," by W. P. Brown. *Hygeia* reprint. Address author, State Education Dept., Albany, N. Y. *Free.* Adequate examinations and follow-up.

"Suggestions for Organizing a Community Social Hygiene Program." American Social Hygiene Assn., 50 West 50th St., New York, N. Y. *10 cents.*

In *Milbank Memorial Fund Quarterly*, 40 Wall St., New York, N. Y. (Oct., 1934; *25 cents*):

"A Project in Rural School Health Education," by Ruth E. Grout. The third paper by the director of health education in Cattaraugus County.

"An Organized Community Health Education Program," by Savel Zimand. Largely based on the Bellevue-Yorkville experience.

"Public Health in Rural Reconstruction at Ting Hsien, by C. C. Ch'en. Includes brief statement on health education.

Reprints from *Journal of Social Hygiene*, 50 West 50th St., New York, N. Y. (*10 cents* each):

"Social Hygiene Education in a City of Medium Size," by J. B. Pinney.

"Popular Health Education in Simplest Terms," by M. S. Edwards. Social hygiene education for Negroes.

"Milk for Men," and "Good Nutrition and Colds," in Dairy Council Digests, National Dairy Council, Chicago, Ill. *Free.*

"Sunkist Food Bulletins — 1935 Series." Calif. Fruit Growers Exchange, Los Angeles, Calif. For "food teachers and nutrition workers."

MAGAZINE ARTICLES

What do any of us do to call attention to any magazine articles we believe would be of value to staff members, or to other groups, or to the general public?

"Making School Lunch-boxes Appetizing," by D. Kirk. *Literary Digest*, 354 4th Ave., New York, N. Y. *10 cents.* Variety adds joy and health values.

"Better Food for the College Man," by H. Ripperger. *New York Times Magazine.* Sept. 23, 1934.

"Brevities of 1934." Editorial page. *Collier's*, Sept. 15, 1934. "We shall be a healthier, more vigorous people."

"California's Medical Mix-Up," by P. K. Brown, M.D. *Survey Graphic*, 112 E. 19th St., New York, N. Y., Sept., 1934. *30 cents.* "Description of California's trials, mistakes and progress in putting essential medical care within reach of her citizens."

"Catholics on Birth Control," by G. I. Burch. *New Republic*, 421 W. 21st St., New York, N. Y. Sept. 5, 1934. *15 cents.* "The crusade of the Roman Catholic Church against the birth-control movement has suddenly turned into a duel over methods."

"Sanctified Birth Control," by D. D. Bromley. *Nation*, 20 Vesey St., New York, N. Y. Sept. 26, 1934. *15 cents.* The "safe period"; some of the evidence for and against.

"Birth Control and the Depression," by D. B. Bromley, *Harper's*, 49 East 33d St., New York, N. Y. Oct., 1934. *40 cents.* Milbank and other statistics; unwanted children chief depression sufferers; medical profession and Catholic Church—both changing face.

"For Legalized Birth Control." *New Republic*, 421 West 21st St., New York, N. Y. 34 pages. *25 cents.* The abortion problem; contraceptive devices and antiseptics; where to get advice.

"In Sickness and in Health," by K. Crichton. *Collier's.* Oct. 20, 1934. "Something is wrong. Millions of Americans are without medical care while thousands of doctors, dentists and nurses are without adequate incomes."

"Sound Facts about Constipation," by W. W. Bauer, M.D. *American Mercury*, 730 Fifth Ave., New York, N. Y., Oct., 1934. *50 cents.* "Each man and woman should be a law unto himself or herself," and why.

"Sparing the rod," by J. Ruhrah, M.D. *Today*, 152 West 42d St., New York, N. Y. *10 cents.* "Many of those who were raised by the rod have escaped both penitentiary and the hospital for the insane."

RADIO

*Education by Radio* will keep you in touch with the efforts to secure adequate broadcasting time for education and other non-commercial interests. The publisher is National Committee on Education by Radio, 1201 16th St., N. W., Washington, D. C. Will be sent *free* upon request.

"Second Series of Radiologs—Radio Talks on Preventive Medicine." Virginia Dept. of Health, Richmond, Va. 68 pages. *Free.* Topics range from "Adenoids" to "Why pioneers had no pellagra."

The fifth radio contest has been announced by Minn. Public Health Assn., 11 West Summit Ave., St. Paul, Minn. The subject: "Youth Takes a Look at Its Greatest Enemy." The awards: Gold medals to the authors of the 10 best manuscripts, and a trip to Minneapolis to broadcast the talks.

The Health Department of New York City carried on a series of summer health broadcasts for children, having asked the teachers and principals before vacation to tell the children about the radio series. As a special attraction, famous athletes were on the programs—Gene Tunney being the first.

# BOOKS AND REPORTS

**Symposium on Silicosis** — *Trudeau School of Tuberculosis, Saranac Lake, N. Y., June 18–22, 1934. Wausau, Wis.: Employers' Mutuals.* 98 pp. Price, $5.00.

This is a printed, but unofficial, transcript of the papers and discussions held informally in connection with the symposium referred to in the title. Several who attended the sessions, which were substituted for one week of the regular 1934 course in the Trudeau School, took elaborate notes and the present compend represents the collection and editing of same under B. E. Kuechle of the Employers' Mutuals. The galley proof was submitted to the various speakers to review and correct, which they did. The introduction was written by Dr. Leroy U. Gardner, Director of Saranac Laboratory.

The subjects covered and their authors include: The Etiology of Silicosis, by Dr. Roy R. Jones, U. S. Public Health Service; Dust Concentration and Methods of Measurement, by Donald E. Cummings, Saranac Lake; Pathology, Human and Experimental, by Dr. L. U. Gardner, Saranac Lake; Occupational History, by Donald E. Cummings; Clinical Aspects and Physical Findings, by Dr. Henry H. Kessler, New Jersey; Roentgenological Findings, by Dr. H. L. Sampson, Trudeau Sanatorium; Roentgenological Diagnosis, by Dr. H. K. Pancoast, Philadephia; Engineering Methods of Prevention, by Prof. Philip Drinker, Harvard; Medical and Legislative Measures of Prevention, by Dr. A. J. Lanza, Metropolitan Life; Fibrosis in Lung Disease, by Dr. William S. McCann, Rochester.

In brief, the volume comprises the latest views of the specialists named, each of whose informal papers is followed by a compact statement of the discussion which ensued.

Due probably to the nature of note-taking, some parts show much said in short, terse sentences so that the meaning may be ambiguous, but there is a wealth of valuable views and summaries of experimental facts, conclusions and observations. The comprehensive outline by Gardner on the pathology of the subject is superb and in itself may be said to condense volumes.

While there may be some comment about the price asked for this little volume, the entire proceeds are to be given to the Saranac Laboratory for research on silicosis—which, while probably the most definite of all afflictions of truly occupational nature, is today the most controversial as to cause, course, complications, and prognosis. Whence, carefully controlled work from an institution like Saranac should be awarded every financial support. The monograph is truly indispensable to any who are interested in the silicosis question.

EMERY R. HAYHURST

**Mothers' Guide When Sickness Comes** — *By Roger H. Dennett, M.D., and Edward T. Wilkes, M.D. Garden City, N. Y.: Doubleday, Doran,* 1934. 400 pp. Price, $2.50.

This book, written by two well known specialists in diseases of children who have had a wide clinical as well as administrative experience, contains a wealth of information which every mother should have available. As stated in the preface, it is not intended to take the place of the doctor, but to aid in carrying out his orders.

The material is divided into four parts, Part I perhaps being the most useful as to the general information which the average mother should have. While all the chapters are good, we especially recommend those on sunshine and milk. Part II considers Infectious and Contagious Diseases, with a discussion on prevention and treatment of those which are incident to childhood. Part III is devoted to Other Common Ailments, such as prickly heat, ringworm, eczema, hives, ivy poisoning, thrush, etc. Part IV contains valuable instructions and advice for caring for the sick child, such as Common Practical Nursing Procedures, a Poison and Antidote Table, Special Diets, Weight-Height Tables, and a glossary. A good index adds to the value of the volume.

There is always some danger that mothers may carry the use of such a book too far, in spite of the warning by the authors that it is not intended as a substitute for the doctor. During times of depression, such as we are going through, this danger is more acute than usual. In view, however, of the delay in sending for a physician so often encountered even in cities where clinics abound, the sound advice given will doubtless aid many and even save lives.

The book is written in a pleasing style which is easily understandable. At the beginning of each chapter we find an appropriate quotation from well known and favorite writers. This excellent work can be heartily recommended and we wish for it a wide circulation. MAZŸCK P. RAVENEL

**The Biology of the Protozoa**—*By G. M. Calkin (2nd ed. rev.) Philadelphia: Lea & Febiger,* 1933. 607 pp., 233 figs. Price, $7.50.

This new edition of Professor Calkins' book has in it many features of value to workers in public health among which are the following: a full account of the structure, life history, physiology, and reproduction of the protozoa; a chapter on parasitic protozoa of the vertebrates, especially of man, with colored plates of the three species of the parasite, Plasmodium, causing malaria; and a detailed account of the classification of the Protozoa with many illustrations of various kinds of Protozoa. No laboratory should be without this valuable source of information in this important field.

C. A. KOFOID

**The Family**—*By M. F. Nimkoff, Ph.D., under the editorship of William F. Ogburn, Ph.D. Cambridge: Houghton Mifflin,* 1934. 526 pp. Price, $3.00.

In view of the marked increase in courses on the family in colleges and the more general recognition of the important position occupied by the family in the social and economic reconstruction, a comprehensive treatment of this subject is timely. As the editor points out, the family has always been a major social institution and until recent times our chief economic unit. But the change which is taking place in family life is making it a different institution than formerly. The book is well balanced, filled with the latest scientific contributions, and clearly written.

The twelve chapters deal with the structure, functions, and early development of the family—biological, economic, and psycho-social aspects, including the child and the marriage relation, family disorganization and reorganization. Influences of colonization, of industrial revolution and of urbanization are considered. Chapters dealing with the biological and economic aspects will be of special interest to public health administrators. Problems of maternal and infant mortality, abortions and illegitimacy are briefly considered, as well as population changes. Students and teachers in several fields

will find this a very useful volume. To executives of health and social agencies, it should prove exceedingly helpful for reference purposes. IRA V. HISCOCK

La Lèpre—*By E. Jeanselme. Paris: G. Goin & Cie*, 1934. 679 pp. 259 figs. 14 col. plates.

Professor Jeanselme, who has contributed materially to our present knowledge of leprosy, has written a thorough-going treatise on leprosy which has appeared as a monumental volume published with aid of the French Government. It was not intended to be a complete compilation of the literature, for there already was such a work; it was to be more personal and critical. Nevertheless, the presentation is far from being dogmatic, and in fact it is sometimes difficult to ascertain precisely what the author's views are. Most questions are fully covered, with much attention to the literature, so that the book is replete with citations and footnote references.

The first of the 15 chapters, the definition of leprosy, covers but a half page. The second, a 4 page table of words signifying leprosy and related terms, is doubtless the most complete list of the sort yet compiled. The same assiduity of compilation is seen in the fourth section, on geographic distribution; it follows one on history, which, beginning with the Bible and earlier documents and coming up to the Manila and Bangkok conferences of 1930–1931, reflects the author's recognized historical bent.

Bacteriology, the first of the technical subjects, is dealt with in a comprehensive chapter in which the attempts at cultivation, held by the author to have been unsuccessful as regards transplants in series, are summarized in periods. The first of these, before 1900, is properly dismissed very briefly; of the most recent reports, those of Wherry (1930), and of Soule and McKinley (1932) have been overlooked. A few pages on rat leprosy, based largely on the numerous reports of Marchoux and his colleagues, follow a discussion of the attempts to transfer the human infection to animals. Serology is dealt with adequately in view of the unsatisfactory status of the matter, but the section on immunity and allergy reflects the small amount of attention that has been given this aspect of the problem.

"General pathology" is a short chapter, but that entitled "anatomoclinical study," which covers both the clinical and pathological features, fills more than 200 pages. Illustrating them are a number of colored plates, most of them representing microscopic specimens, that are exceptionally fine. There is a long chapter on etiology followed by short ones on the evolution of the disease and prognosis. Diagnosis is given more space and prophylaxis much more. Treatment is a most important chapter. The author holds that there is no specific remedy but that amelioration, and perhaps cure, is possible by means of a course in which parts are taken by personal hygiene, care of complicating conditions, and special agents, the last referring particularly to chaulmoogra medication.

It is impracticable to attempt to set forth here more than a few of the author's views, but all of them are entitled to consideration. Unfortunate features of the book are, its size and weight—nearly 13 x 10½ inches over all, and weighing nearly 10 pounds—and the lack of an index, its place being occupied by a topical summary more appropriate for the front of the book. It would be unfortunate if these features, or its cost, should serve as deterrents to its general use, for it is a really valuable work and should be in all medical libraries and in the hands of all who are doing serious work in leprosy. H. W. WADE

**Benjamin Rush. Physician and Citizen, 1745–1813**—*By Nathan G. Goodman. Philadelphia: University of Pennsylvania Press,* 1934. 421 pp. Price, $4.00.

Doubtless many will be as surprised as was the author of this book, to discover that there existed no biography of Rush, in many ways the most distinguished of early American physicians —"The American Sydenham," as he has been called. The public and the medical profession owe to the author a peculiar debt of gratitude for the present volume, written some 120 years after the death of this distinguished man.

The work has all the earmarks of a labor of love. It is well documented and is a mine of information concerning the early days of our country, the Revolutionary War, and some of the master minds who laid the foundation on which the medical profession of America stands today—unsurpassed by any in the world. From the medical standpoint, the book is particularly interesting in its account of the epidemics of yellow fever in Philadelphia, especially the great epidemic of 1793. Though this led Rush into a bitter controversy, it shows him to have been a master mind. He apparently believed for some time in the contagiousness of yellow fever, but abandoned this idea and charged its origin to local conditions. This brought upon him bitter attacks, some even going so far as to declare him insane. His practice during the great epidemic was enormous. His treatment was bleeding and purging, an idea he obtained from Dr. John Mitchell, who wrote on the disease in 1744. He held that the lives of 6,000 Philadelphians were saved by this treatment. While we cannot accept Rush's ideas, "there was something heroic as well as deeply spiritual about his labors." On one occasion he said, "Thank God, out of the hundred patients I have visited or prescribed for this day, I have lost none."

Rush was a most remarkable man, and one wonders how he could engage in so many activities and show mastery in all. He was most interested in the abolition of slavery, the abolition of death penalty, and restriction in the use of alcohol and tobacco. He was president of one of the first cotton mills in America, in 1775, feeling it necessary on account of the embargo on the importation of British goods, to provide for the needs of Americans in this line. He was the founder of the first free dispensary, the first temperance and anti-slavery societies, the first Sunday School system, one of the founders of the College of Physicians, active in the foundation of Franklin and Marshall College and of Dickinson College. He was the first American psychiatrist and the first professor of chemistry, having been appointed in 1789 to that chair in the College of Philadelphia, completing the faculty of the first medical college in America. In April, 1777, he was appointed Surgeon General of the Medical Department of the Continental Army. Unfortunately, apparently owing to his friendship for Generals Gates and Conway, he became involved in the Conway Cabal. Wrong as he was, and though a bitter critic, he was a patriot and never a conspirator. He also was ruthless in condemning Dr. William Shippen, Director-General of the medical department.

Rush made some remarkable medical observations. He was among the first to recognize the relationship between infected teeth and arthritis, and in his treatment of chronic diseases, examined the teeth and extracted the decayed ones. He gives a number of cases in which severe systemic disease was entirely cured by getting rid of the focal infection. This was done approximately 130 years ago, yet the influence of focal infections is generally considered one of our recent discoveries due to bacteriology. It is most interesting also to

note his introduction of the Suttonian system of inoculating against smallpox, to which he attributed a great increase in his practice. This restricted the inoculation to a small puncture instead of the then popular long incision, and may be regarded as the distinct predecessor of the modern method of performing the Jennerian vaccination. However, as soon as Jenner announced his discovery, Rush became a convert.

We wish we were able to speak at greater length of this remarkable man, but the book must be read to obtain anything like a fair appreciation of him. We cannot do better than close with two quotations:

> His character was laid upon foundations of integrity and service, and once he was sure within himself of the soundness and morality of his stand, he resolutely refused to compromise. He would not yield an inch even to gain a foot; and therefore he was doomed to meet defeat and condemnation many times when he deserved better. Furthermore, his candid self-righteousness only aggravated his adversaries and made him deaf to reason as well. It was a tragic contradiction of Rush's life that his stubborn individualism obscured the originality of his mind, the attractiveness of his personality, and the honesty of his motives.
>
> Benjamin Rush was a leader in many fields: he was a great physician, a talented teacher, a competent scientist, an able organizer, a felicitous writer, a vigorous social reformer, an earnest philanthropist, a creative scholar, and a devoted patriot.

MAZŸCK P. RAVENEL

Diphtheria. **Past and Present**—*By J. Graham Forbes, M.D., Principal Assistant Medical Officer, London County Council; Late Milroy Lecturer, Royal College of Physicians. London: John Bale, Sons & Danielsson, Ltd.*, 1932. 832 pp. Price, $15.00.

This monumental work has as its basis the Milroy Lectures of the Royal College of Physicians for 1929. There was considerable delay in publication, and many additions were made.

The book is a veritable encyclopedia of pretty nearly everything which science and experience have taught us concerning diphtheria—Etiology, Distribution, Transmission, and Prevention, each of which forms a section of the book. Much space is given to the distribution in England and Wales, which is of more interest to the inhabitants of the British Isles than to Americans though necessarily there is much in the survey which is applicable to many parts of the world. However, reviews are given of the situation in the United States, Canada, South America, and Germany, though the chief consideration of these surveys is preventive work. A conclusion sums up the matter in a very satisfactory way. This is followed by a good general index, a geographical index, and a list of the authors quoted, all of which make the book easy to use and will serve for the student as a source book.

During the past 2 years we have learned much about new materials for the prevention of diphtheria. Toxin-antitoxin, toxoid-antitoxin, toxoid-antitoxin floccules, and toxoid (anatoxin) are discussed. In America the alum precipitate is gaining ground rapidly. With this exception, the methods described, discussed and evaluated by the author are up to date.

The author is well known and his official position has given him unusual opportunity for mastering the subject of which he treats.

The book has an introduction by Sir Frederick Andrewes. The work is not only voluminous but every item is well considered and treated with the conservatism and sound judgment which characterize English scientists. It can be recommended most heartily to health officers, physicians in general, and all who are interested in the various phases of the diphtheria problem, though it is not suitable for popular reading.

MAZŸCK P. RAVENEL

**Child Guidance Clinics**—*By George S. Stevenson, M.D., and Geddes Smith. New York: The Commonwealth Fund,* 1934. 186 pp. Price, $1.50.

One of the most interesting, though relatively unfamiliar developments of the 20th century has been the child guidance clinic. The average public health worker is somewhat at a loss to evaluate it. Hence this succinct story of the origin, development, and present status of the clinics, published by the Commonwealth Fund which has had such a large share in its life, is worth the reading by everyone interested in the progressive welfare movements of the day.

The book opens with an orienting chapter on child guidance. Then, after a chapter devoted to backgrounds, there is a discussion of the "pioneer clinics," in which, among that of others, Dr. Healey's work in Chicago and Boston receives sympathetic consideration. Chapter four is devoted to the story of the demonstration clinics conducted by the National Committee for Mental Hygiene and financed by the Commonwealth Fund. These are covered individually and in some detail, with special reference to the part each played in furthering the development of the child guidance principle.

The latter part of the book is devoted to what is called "the present pattern" and a discussion of Trends and Possibilities. This is the part which will appeal most to the general child hygiene worker since we all are interested in the future of this kind of approach to the problem of the child who may be headed for delinquency or mental disease.

The authors are eminently fair in their discussion of the possibilities of the clinic. They do not minimize its relatively large cost and limited facilities. They feel that "the hypotheses on which the child guidance clinics base their program are still fluid"; hence the impossibility at present of offering definite rules for the instruction of the non-psychiatric worker. This is of course a sound position to take, though disappointing undoubtedly to many.

It would seem to be a fair conclusion that private agencies should continue to finance child guidance clinics during their experimental years, if not longer. One might venture the opinion that, in view of the relatively large staff and expense involved as compared with the relatively small group of children which can be handled effectively, these clinics for a long time to come should be thought of as laboratories and, perhaps, teaching centers rather than as clinics in the ordinary acceptation of the word.

MERRILL E. CHAMPION

**Hygiene and Home Nursing**—*By Louisa C. Lippett, R.N. Yonkers, N. Y.: World Book Co.,* 1934. 424 pp. Price, $1.24.

It is somewhat of a disappointment to find such attractive covers enclosing rather trite and unimaginative material and such well printed pages including information which is not quite up-to-date. The discussion of underweight and overweight does not consider the newer ideas of the importance of growth rather than comparison with a standard. Posture becomes in this book a matter of exercises rather than an evidence of good mental and physical health. The chapter on tuberculosis is scarcely complete since it leaves out the entire topic of tuberculin testing, regarding which it is especially important that lay people be informed. Soap is not mentioned as a disinfectant although far less simple and more uncommon disinfectants are suggested in the care of communicable disease cases.

We had hoped to find in such a textbook for high school girls interesting suggestions for finding information and trying out some new adventures in

health. Instead we find only good but prosaic questions at the end of each chapter and no suggestions for reference reading.

Many women and girls would find the terms confusing and would find difficulty in adapting some of the technics to the home. The book is written from the standpoint of the graduate nurse rather than from that of the home maker.

The descriptions of anatomy and physiology are clear and quite interesting and could be used to supplement less simple material.

VIRGINIA A. JONES

# A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

**What the Public Wants**—Invited to send in questions to be answered in a radio health forum or in a newspaper substitute, the public showed its interest in disease rather than health. After many unsuccessful attempts to curb the appetite for information about pathological conditions, the question and answer method was dropped.

CHADWICK, H. D., and LOMBARD, H. L. The Health Forum. New Eng. J. Med., 211, 17:767 (Oct. 25), 1934.

**About Amebic Dysentery**—The epidemiology of amebiasis differs little from that of other food and waterborne diseases. Important factors in successful epidemiology in this disease are the recognition of its prevalence and a thorough understanding of its nature and transmission. This is one of several excellent papers constituting a symposium on the subject.

CRAIG, C. F. The Epidemiology of Amebiasis. J.A.M.A., 103, 14:1061 (Oct. 6), 1934.

**Some Considerations About Health Insurance** — Administrative problems which any project in insured medical care must face are set forth to suggest that pioneering in this social field must be guided by critical appraisal and research.

DAVIS, M. M. Sickness Insurance and Medical Care. Milbank Quart., 12, 4:287 (Oct.), 1934.

**Vaccination at Birth**—Vaccination of the new-born baby is a practical procedure, though the newly-born child is resistent to infection with the virus. It need not be done at birth if it can be assured at 3 to 6 months.

DONNALLY, H. H., and NICHOLSON, M. M. A Study of Vaccination in Five Hundred Newborn Infants. J.A.M.A., 103, 17:1269 (Oct. 27), 1934.

**In Which Families Does Case-Finding Pay?**—Accurately kept records indicate that it costs so much to discover adult type tuberculosis by tracing tuberculin positive groups of children that intensive case-finding seems uneconomic. However, this is not true of active pulmonary or tuberculous meningitis cases. These should have prompt follow-up.

EDWARDS, H. R., and UNZICKER, G. A Cost Analysis of Clearing Tuberculosis Family Contacts. Milbank Quart., 12, 4:306 (Oct.), 1934.

**Spreading Scarlet Fever**—Patients with uncomplicated cases of scarlet fever may be as dangerous carriers as those with complications. The authors believe that quarantine, of any length,

will not control scarlet fever and that the hope lies in active immunization.

HOYNE, A. L., and BAILEY, J. H. The Secondary Case of Scarlet Fever. J.A.M.A., 103, 14:1051 (Oct. 6), 1934.

**Expanding Conception of School Child Hygiene**—Ten factors in the success of the school health program are considered in some detail to present a useful bird's-eye-view of school child health administration.

IRELAND, I. G. Essentials of the School Health Program. J. Health & Physical Education, 5, 7:15 (Sept.), 1934.

**A Slow Start for a Long Race**—These are significant findings: the rat's life span is extended if the animal growth is retarded by inadequate calories (but sufficient essential nutrients) in youth.

MCCAY, C. M., and CROWELL, M. F. Prolonging the Life Span. Scient. Month., 39, 5:405 (Nov.), 1934.

**Psittacosis Highly Infectious** — The story of 11 laboratory workers who came down with psittacosis illustrates the unusual infectiousnes of the disease, for only 2 were in contact with infected birds, though all were in the same building.

MCCOY, G. W. Psittacosis Among the Personnel of the Hygienic Laboratory. J. Infect. Dis., 55, 2:156 (Sept.-Oct.), 1934.

**Rural Health Yardstick** — This survey of a rural health administrative unit to determine the health problems of the peoples involved, the quality and quantity of service rendered, the relationship of the program to the needs of the community, and the specific effect, if any, upon individual health, should prove a most valuable measure of this still largely unsolved problem. The answers will be found in subsequent papers to appear in series.

MOUNTIN, J. W. Effectiveness and Economy of County Health Department Practice. Pub. Health Rep., 49, 42:1232 (Oct. 19), 1934.

**Against Tuberculosis Vaccination**—Further improvement in tuberculosis mortality rates must come through better epidemiology not vaccination, asserts the author in reviewing the history of tuberculosis immunization.

PETROFF, S. A. Anti-Tuberculosis Vaccination. New Eng. J. Med., 211, 15:677 (Oct. 11), 1934.

**Controlling Gonorrhea and Syphilis**—Epidemiology and health education, the hare and the tortoise of all communicable disease prevention, are summarized in their applicability to venereal disease control. A stimulating paper.

STOKES, J. H. Public Health and Social Hygiene. Pub. Health Nurs., 26, 10:535 (Oct.), 1934.

**Athletes' Hearts**—Enlarged hearts were found in about half the ricksha pullers examined, a condition appearing to be a physiologic response to rapid exertion carried on daily for years. There is no indication that the resulting enlargement predisposes to disease.

TUNG, C. L., *et al.* The Hearts of Ricksha Pullers. Am. Heart J., 10, 1:79 (Oct.), 1934.

**Telling 'Em About Health**—Analyzing the elements of a community health education program, the author presents a useful check to be used to measure any community project in health promotion.

ZIMAND, S. An Organized Community Health Education Program. Milbank Quart., 12, 4:329 (Oct.), 1934

# BOOKS RECEIVED

PHYSIOLOGY IN HEALTH AND DISEASE. By Carl J. Wiggers. Philadelphia: Lea & Febiger, 1934. 1156 pp. Price, $9.00.

POPULATION THEORIES AND THEIR APPLICATION, WITH SPECIAL REFERENCE TO JAPAN. By E. F. Penrose. Stanford University, Food Research Institute, 1934. 347 pp. Price, $3.50.

DYNAMICS OF POPULATION. By Frank Lorimer and Frederick Osborn. New York: Macmillan, 1934. 461 pp. Price, $4.00.

A SHORT HISTORY OF SOME COMMON DISEASES. Edited by W. R. Bett. New York. Oxford University Press, 1934. 211 pp. Price, $3.50.

YOUR MEALS AND YOUR MONEY. By Gove Hambridge. New York: McGraw-Hill, 1934. 190 pp. Price, $1.50.

HEALTHY BABIES ARE HAPPY BABIES. A complete Handbook for Modern Mothers. By Josephine Hemenway Kenyon. Boston: Little Brown, 1934. 321 pp. Price, $1.50.

INSTITUTIONAL CARE OF MENTAL PATIENTS IN THE UNITED STATES By John Maurice Grimes. Chicago: Author, 1934. 138 pp.

WEBSTER'S NEW INTERNATIONAL DICTIONARY. 2nd ed. Unabridged. Springfield, Mass.: G. & C. Merriam Co., 1934. 3210 pp. Price, $20.00. Buckram binding.

HEALTH WORKBOOK FOR COLLEGE FRESHMEN. By Kathleen Wilkinson Wootten. New York: Barnes, 1934. 220 pp. Price, $1.50.

YOU CAN MASTER LIFE. By James Gordon Gilkey. New York: Macmillan, 1934. 186 pp. Price, $1.75.

THE MODERN HOME PHYSICIAN. A New Encyclopedia of Medical Knowledge. By Victor Robinson, Editor. New York: Wise, 1934. 728 pp. Price, $3.50.

MENTAL HYGIENE FOR EFFECTIVE LIVING. By Edwin A. Kirkpatrick. New York: Appleton-Century, 1934. 387 pp. Price, $3.00.

DOCUMENTS OF AMERICAN HISTORY. Edited by Henry Steele Commager. New York: Crofts, 1934. 454 pp. Price, $4.00.

COMMUNITY HYGIENE. A Text Book in the Control of Communicable Diseases. By Laurence B. Chenoweth and Whitelaw Reid Morrison. New York: Crofts, 1934. 317 pp. Price, $2.50.

CHILDREN OF THE PRESCHOOL AGE. By Ethel Kawin. Chicago: University of Chicago Press, 1934. 340 pp. Price, $3.50.

TEXTBOOK OF MATERIA MEDICA AND THERAPEUTICS. 6th ed. By A. S. Blumgarten. New York: Macmillan, 1934. 791 pp. Price, $3.00.

INDUSTRIAL MALADIES. By Sir Thomas Legge. New York: Oxford Press, 1934. 234 pp. Price, $4.25.

ALLERGY AND APPLIED IMMUNOLOGY. 2nd ed. By Warren T. Vaughan. St. Louis: Mosby, 1934. 420 pp. Price, $5.00.

HEALTH STORIES. Book Two. By Anna B. Towse, Florence E. Matthews and William S. Gray. New York: Scott, Foresman & Co., 1934. 176 pp. Price, $.68.

HEALTH AND HAPPINESS SERIES. Health in Good-Habit Land, Pathways in Healthland and Highroads to Health. Revisions of the first three books of the Health and Happiness Series by S. Weir Newmayer and Edwin C. Broome. New York: American Book Co., 1934. Price, $.64, $.72, and $.84 respectively.

THE PATIENT AND THE WEATHER. Volume III. Mental and Nervous Diseases. By William F. Petersen. Ann Arbor: Edwards Bros., 1934. 375 pp.

HEREDITY AND DISEASE. By Dr. Otto Mohr. New York: Norton, 1934. 253 pp. Price, $3.50.

HANDBOOK OF CHEMISTRY. Compiled and Edited by Norbert Adolph Lange. Sandusky: Handbook Publishers, 1934. 1545 pp. Price, $6.00.

THE PRACTICE OF DIETETICS. By L. Harry Newburgh and Frances Mackinnon. New York: Macmillan, 1934. 264 pp. Price, $4.00.

BIG PROBLEMS ON LITTLE SHOULDERS. A Grownup's Guide to a Child's Mind. By Carl Renz and Mildred Paul Renz. New York: Macmillan, 1934. 129 pp. Price, $1.50.

MATERNAL MORTALITY IN PHILADELPHIA, 1931–1933. Report of Committee on Maternal Welfare. Philadelphia County Medical Society, 1934. 143 pp. Price, $1.00.

DIABETIC MANUAL FOR PATIENTS. 2nd ed By Dr. Henry J. John. St. Louis: Mosby, 1934. 232 pp. Price, $2.00.

RULES FOR RECOVERY FROM PULMONARY TUBERCULOSIS. 6th ed. By Lawrason Brown. Philadelphia: Lea & Febiger, 1934. 275 pp. Price, $1.75.

SYNOPSIS OF GENITOURINARY DISEASES. By Austin L. Dodson. St. Louis: Mosby, 1934. 275 pp. Price, $3.00.

THE DOCTOR IN HISTORY. By Howard W. Haggard. New Haven: Yale University Press, 1934. Price, $3.00.

PLUNGE IN PURITY WITH SAFETY (hygienic control of swimming pools). Everson Filter Co., 627 Lake St., Chicago, Ill., 1934. 12 pp. Free.

# ASSOCIATION NEWS

## APPLICANTS FOR MEMBERSHIP

*The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.*

*Health Officers Section*

Wade H. Anderson, M.D., Wilson, N. C., County Health Officer

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*Public Health Education Section*

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Vera McCrea, Dairymen's League Coöperative Assn., 11 W. 42 St., New York, N. Y., Director, Health Education Department

Samuel G. Paul, M.D., Boston Bldg., Salt Lake City, Utah, Medical Director, City Schools

E. Frances Rodgers Annis, 5101 Crenshaw Blvd., Los Angeles, Calif., Public Health Chairman, Women's Auxiliary, Parent-Teachers Assn.

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Mae E. Mathers, R.N., Box 293, Ashland, Va., Red Cross Public Health Nursing Service, Hanover County

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ing Staff, Communicable Diseases Unit, Los Angeles County General Hospital, Unit # 1

*Unaffiliated*

Mary S. Epstein, M.A., 222 E. 82 St., New York, N. Y., Instructor, Public Health and Hygiene, Hunter College

### APPLICANTS FOR FELLOWSHIP

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*Unaffiliated*—Otto C. Murphy, Kansas City, Mo.; Edward Lacy Pettibone, D.D.S., Cleveland, O.; James Gayley Townsend, M.D., Washington, D.C; Frances Stern, Boston, Mass.

### DECEASED MEMBERS

Jorge Le-Roy, M.D., Habana, Cuba, Elected Member 1911, Fellow 1923

E. Linwood Cornman, V.M.D., Marietta, Pa., Elected Member 1926 (Associate)

Henry A. Cotton, M.D., Trenton, N. J., Elected Member 1932

Charles W. Many, M.D., Doylestown, Pa., Elected Member 1917

Herbert C. Ober, M.D., D.M.D., Newton, Mass., Elected Member 1932

George W. Fuller, New York, N. Y., Elected Member 1915, Fellow 1922.

H. L. Abramson, M.D., St. John, N. B., Canada, Elected Member 1919

Carroll W. Eddy, D.V.M., Cleveland, O. Elected Member 1926

M. B. Harutun, M.D., Joplin, Mo., Elected Member 1920, Fellow 1923

George T. Lennon, Haverhill, Mass., Elected Member 1918

Thomas J. Strauch, Richmond, Va., Elected Member 1919

### SOUTHERN BRANCH A.P.H.A.

At its third annual meeting in San Antonio, Tex., November 13–16, the Southern Branch A.P.H.A. elected the following officers:

*President*, C. E. Waller, M.D., Washington, D. C.

*1st Vice-President*, V. M. Ehlers, Austin, Tex.

*2nd Vice-President*, I. C. Riggin, M.D., Richmond, Va.

*3rd Vice-President*, Ruth Mettinger, R.N., Jacksonville, Fla.

*Secretary-Treasurer*, G. F. McGinnes, M.D., Richmond, Va.

### BACK NUMBERS WANTED

Readers of *The American Journal of Public Health* are asked to send spare copies of the January, 1928, and of the January, 1933, issue to the American Public Health Association, 50 West 50th Street, New York, N Y., as these issues are out of stock. These will be much appreciated, and reimbursement of postage will be made in each case.

# NEWS FROM THE FIELD

## The Michigan Public Health Conference

A LARGE and enthusiastic group of health workers gathered at the Hotel Olds in Lansing on November 7, 8, and 9, for the 14th Annual Public Health Conference conducted by the Michigan Department of Health and the Michigan Public Health Association.

By noon on the 7th, 291 persons had registered, although the first session was not scheduled until 2.00 P.M. This was opened by C. C. Slemons, M.D., State Health Commissioner. After a brief welcoming address, he introduced the speaker of the afternoon, Carl V. Weller, M.D., Professor of Pathology at the University of Michigan, who spoke on "Cancer as a Public Health Problem," to an audience numbering more than 400. Thereafter, the assembly divided into specialized groups and attended the arranged round tables for health officers, public health nurses, sanitary officers and laboratory directors.

The intentness of the various audiences was noteworthy, and the emptiness of the hotel lobby and corridors for the entire afternoon provided significant evidence of the pulling power of the programs.

Informal dinner meetings preceded the evening session which was presided over by Chalmers J. Lyons, D.D.Sc., Professor of Oral Surgery at the University of Michigan and a Member of the State Council of Health. Samuel M. Gordon, Ph.D., Secretary, Council on Dental Therapeutics, American Dental Association, was the speaker and his subject was "Mouth Washes and Dentifrices, Their Advertising, and Public Health Work."

Louis J. Hirschman, M.D., Detroit, a Member of the State Council of Health, opened the Thursday morning meeting promptly at 9.00 A.M. "Welfare Relief in Michigan" was presented by the State Relief Administrator, William Haber. Two papers on Vital Statistics followed, one by W. J. V. Deacon, M.D., the other by T. F. Murphy, M.D. Dr. B. W. Carey, President of the Michigan Public Health Association, delivered the Presidential Address at the luncheon business meeting of the organization.

The afternoon program was devoted to "The Rôle of Nutrition in Public Health." Robert B. Harkness, M.D., Houghton, President of the State Council of Health, presided. The speakers were J. A. Johnson, M.D., Helen S. Mitchell, Ph.D., Lelia McGuire and Don J. Barnes, M.D.

The Conference Dinner on Thursday evening was very well attended. George J. Curry, M.D., Flint, Member of the State Council of Health, was Toastmaster and the speaker was Shirley W. Allen, Professor of Forestry, University of Michigan, on the topic "Fighting Waste with the CCC."

The Friday morning session was given over to a program of miscellaneous technical subjects including tuberculosis, preparation, standardization, and use of alum precipitated toxoid, immunization against poliomyelitis, streptococcic sore throat. Such experts as Drs. Forsbeck, Bunney, Newitt, Littlejohn, Mr. T. J. Werle, Drs. Cummings and Barrett were the speakers.

Held coincidentally with the Conference was a meeting of the Michigan Association of School Physicians, who conducted a luncheon meeting and an afternoon session on school health problems, and of the State Organization of Public Health Nurses.

The Conference adjourned at noon on Friday. Praise and credit go to Dr. Slemons and the members of his staff who assisted him in preparing the program, in making the excellent arrangements and, most particularly, for assembling such a large number of interested and interesting people at a state meeting.

### NEW JERSEY HEALTH AND SANITARY ASSOCIATION

THE 60th anniversary of the New Jersey Health and Sanitary Association was observed at Asbury Park on November 16 and 17. A most interesting program had been prepared and a goodly number were there to appreciate it.

On Friday afternoon, two sessions were held, one a General Session at which Russell Van Nest Black, Dr. Allen G. Ireland, and Dr. LeRoy A. Wilkes, F.A.P.H.A., discussed the Planned Development of the State of New Jersey and Its Relation to General Public Welfare, The New Jersey School Health Program, and The Medical Society of New Jersey Organizes to Improve Community Health Services, respectively. In addition, a special session on various problems in sewage disposal was held for the benefit of those concerned.

At the Friday evening session, Dr. Thomas Parran, Jr., F.A.P.H.A., was the guest speaker discussing Health and Medical Relief in New York State. This session was widely attended by both the delegates present at the meeting and interested persons from neighboring towns.

The highlight of the evening session was the presentation of an award in the form of a bronze plaque to Dr. Theobald Smith of Princeton.

An interesting summary of the work of Dr. Theobald Smith appears in the November number of *Health Progress*, the monthly publication of the New Jersey Health and Sanitary Association.

The Saturday morning session was given over to a round-table discussion of various association projects and an annual business meeting.

### DR. THEOBALD SMITH GETS AWARD

ON November 16, the annual award for meritorious service in the fields of medicine and science, given by the New Jersey Health and Sanitary Association, was presented to Dr. Theobald Smith of the Rockefeller Institute, Princeton. It was accepted in absentia by Dr. Carl Ten Broeck, associate director of plant and animal pathology at the institute.

Dr. Smith received the Copley Medal of the British Royal Society last November in recognition of his research into diseases of animals and man. One of his most notable achievements was the discovery that Texas cattle fever was caused by the bite of an infected tick. This led the way to other discoveries of like importance in malaria infections. Dr. Smith also discovered the cause of bovine tuberculosis.

The presentation was made by James E. Brooks of Newark, president of the association. Mr. Brooks reviewed Dr. Smith's 50 years as a physician, teacher, student, and scientist, and called attention to his many achievements for the benefit of mankind and animals. The award was a bronze plaque.

In 1930 Dr. Smith was awarded the Sedgwick Memorial Medal at the A.P.H.A. meeting in Fort Worth, Tex.

### $1,000,000 FERA FUND GOES TO RURAL HEALTH

*Federal Service to Aid Units in States*—To make more efficient the rural health service in areas severely hit by the depression, $1,000,000 has been allotted from Federal Emergency Relief funds to the Public Health Service.

"The Public Health Service will give financial aid through state health de-

partments toward the maintenance of existing full-time county or district health units when local funds available are insufficient to provide for adequate health service," a Treasury announcement said.

The service will undertake to establish new full-time rural units when local funds are insufficient to meet the entire cost. It will not contribute to any project in which less than 50 per cent of the cost is borne by state or local authorities.

There are 550 full-time county units, as compared with 16 in 1933. The first unit was organized in 1911 in Yakima County, Wash., State officials at that time asking federal aid in setting up an agency to combat typhoid fever.

"It is estimated that less than 25 per cent of the rural population of the country has the benefit of full-time health service at the present time," the Treasury said.—*New York Times*, Oct. 24, 1934.

### RECORD FORMS FOR TUBERCULOSIS SANATORIA

FOR the first time it is now possible for tuberculosis sanatoria to keep uniform and complete records of all material facts about their patients, available at all times for instant consultation. This important improvement in health bookkeeping is a result of 2 years' work done by a committee of the American Sanatorium Association, assisted in a secretarial capacity by members of the staff of the National Tuberculosis Association. The 23 new forms which have been prepared are obtainable from the Livingston Press, Livingston, N. Y.

Forms are numbered and designated, as follows:

1. History—4 pages
1A. History
2. Examination
3. Nose, Throat, Ear, and Eye—Teeth
4. Physician's Orders
5. Nurse's Record
6. Weight Chart
7. Temperature, Pulse, and Respiration
8. Laboratory Examinations (Sputum, etc.)
9. Laboratory Examinations (Blood, etc.)
10. X-ray
11. Re-examination
12. Pneumothorax
13. Exercise Chart
14. Heliotherapy
15. Prescription for Physiotherapy
16. Consultation
17. Operations
18. Tuberculous Empyema
19. Permission for Autopsy
20. Admissions—Discharges
21. Statistical Summary on Discharge
22. Blank form (heading only)
23. File folder

### DIRECTORY OF HEALTH OFFICERS

THE U. S. Public Health Service has published a Directory of the Full Time County Health Officers in the United States, in *Public Health Reports* for September 28, page 1134, compiled from data furnished by state Health Officers as of Jan. 1, 1934.

Similar directories have been published annually since 1922, except for 1932, when funds were not available.

### CHILD LABOR DAY—JANUARY 26–28

THE last week end of January, 1935, has been designated for the observance of Child Labor Day by the National Child Labor Committee, following a custom of nearly 30 years.

The keynote this year will be ratification of the Federal Child Labor Amendment. This Amendment is now before the states for ratification; it is stated to be merely an enabling act specifically empowering Congress to legislate on the subject.

### AMERICAN AMBULANCE MAKES DEBUT IN JERUSALEM

OX carts and donkeys as transports for the sick of Jerusalem will give way to a brand new Ford ambulance fully equipped in accordance with New York hospital standards, which has just

arrived in the Palestine capital, according to word received by Hadassah, the Women's Zionist Organization of America.

The ambulance, said to be the first ever to appear in the Holy Land, was consigned to the Rothschild-Hadassah Hospital. It was shipped from New York by Mrs. Rive K. Weinstein, sister of Dr. Ira I. Kaplan, head of the cancer division of the New York Department of Hospitals.

### HYGIENE INFORMATION CENTER IN FRANCE

A FREE hygiene information center, the first of its kind in France, was recently opened in a crowded district of Paris by a private physician. The center will give information on such subjects as personal hygiene, housing hygiene, physical exercise, swimming pools, infant and child hygiene, hygiene of work, measures against venereal and other contagious diseases, and health legislation, and will supply the addresses of welfare agencies.

The physicians at the center are prohibited from giving treatment or advice to ill persons.—*Le Nourrisson,* Paris, No. 4, July, 1934.

### ROCKEFELLER FOUNDATION

THE Rockefeller Foundation expended for public health work during the year the sum of $3,286,063.01. It supported laboratories for yellow fever research in Lagos, Nigeria; Bahia, Brazil; and New York City. It completed, in coöperation with various governments of West Africa, an extensive survey which disclosed the areas in Africa where yellow fever occurs; assisted the governments of Brazil and Bolivia in an extensive program of yellow fever control; conducted experiments and studies on the vaccine and virus of yellow fever and on the mosquito vectors of this disease; aided three states in the United States and seventeen foreign governments in antimalaria work; carried out malaria studies and surveys in various parts of the world; engaged in studies of hookworm disease in Palestine, Egypt, Straits Settlements, and Puerto Rico; supported studies of *Endamoeba histolytica,* Rocky Mountain spotted fever, tuberculosis, sprue anemia, filariasis, schistosomiasis, and the diseases affecting the races of the Pacific; aided the government of India in conducting experiments on the disposal of refuse; sponsored studies of statistical epidemiology; contributed toward the development of state and local health services of fifteen European countries, the League of Nations, five Far Eastern countries, the government of the South Pacific Islands, six countries of the Caribbean region, two countries of South America, and the governments of Mexico and Canada; gave assistance to the central health administrations of fourteen states in the United States and to the local health administrations of twenty-three states of the United States, four provinces of Canada, and five areas in Mexico, and provided funds for local health units in fourteen other countries; directed the studies of 197 fellows in public health, thirty-two nursing fellows, and six nurse visitors; provided financial aid to former fellows in carrying out special studies; and contributed toward the support of schools of hygiene and public health and of centers of public health training in Japan, Puerto Rico, Central America, South America, Europe, and the United States.—Excerpt from Report for 1933.

### CHANGES IN THE COST OF LIVING, OCTOBER, 1934

THE first decline since April of this year in the cost of living of wage earners in the United States was noted in October, according to the indexes computed by the National Industrial Conference Board. Increases in the cost of some major groups of expendi-

ture were offset by declines in others; the net result was a slight decrease of 0.1 per cent. Living costs in October were 3.7 per cent higher than in October, 1933, but 19.9 per cent lower than in October, 1929.

The purchasing value of the dollar was 123.6 cents in October as compared with 123.5 cents in September, 139.9 cents in April, 1933, and 100 cents in 1923.

Food prices declined 1.0 per cent from September to October which is contrary to the usual seasonal upward movement at this time of the year and also in sharp contrast to the increase of 4.4 per cent which took place from August to September. There has been an increase of 7.8 per cent in food prices since October, 1933, and a decrease of 28.0 per cent since October, 1929.

Rents continued their upward trend, rising 0.6 per cent from September to October, which made them 5.1 per cent higher than in October, 1933, but still 27.9 per cent lower than in October, 1929.

Clothing prices changed only to a small degree from September to October, both men's and women's clothing declining 0.1 per cent. While clothing prices in October were distinctly higher, namely, 25.8 per cent, than in June, 1933, when the upward movement in clothing prices was first observed, as compared with October, 1933, there has been a decline of 0.3 per cent and they were still 21.7 per cent below the level of October, 1929.

Coal prices advanced 0.2 per cent from September to October, less than is usually observed in the fall. Coal prices in October were 2.1 per cent higher than a year ago but 7.3 per cent lower than five years ago.

The index of the cost of sundries was 0.4 per cent higher in October than in September because of increases in the prices of admissions to motion picture theatres, as well as in prices of tobacco and house furnishings. The data in regard to admissions to motion picture houses are obtained in October of each year. The cost of sundries in October was 1.5 per cent above that of October, 1933, and 6.5 per cent below October, 1929.—National Industrial Conference Board Release, Nov. 13, 1934.

### MATERNAL WELFARE IN ITALY

AS a measure against the high maternal mortality rate in Italy, the Minister of the Interior has issued a circular to the various prefects urging them to establish sufficient prenatal centers and maternity hospitals and to investigate every death of a mother or baby during confinement or soon afterward. The Minister points out the importance of providing obstetric service at home, including the necessary materials for women of small means. For the improvement of the obstetric service the Minister urges the prefects to coöperate with the provincial branches of the National Bureau for Maternal and Child Welfare, giving special attention to rural communities.—*Difesa Sociale*, Rome, May, 1934.

### DEATH OF PROFESSOR P. F. NICHOLS

THE University of California announces the death of Professor Paul F. Nichols, of the Fruit Products Staff of the College of Agriculture.

From 1918 to 1924 he was engaged in fruit and vegetable dehydration investigation of the U. S. Department of Agriculture on the Pacific Coast. From 1924 to 1926 he served as chief chemist in standardization investigations for the Sun-Maid Raisin Growers Association at Fresno, Calif. Since that time he has been in charge of fruit drying and dried fruit packaging investigations at the University of California in Berkeley.

He was a member of the American Public Health Association and delivered a paper at the Pasadena meeting which was published in the November *Journal*.

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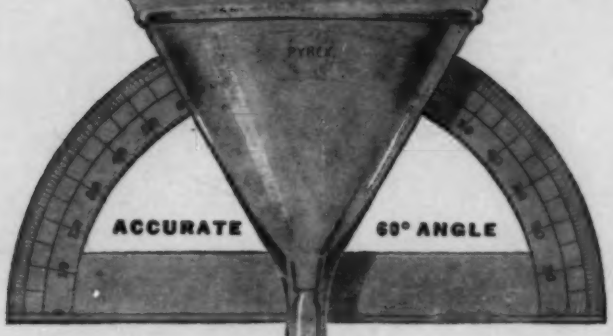


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Levine's Eosin Methylene Blue Agar, Difco, is an excellent plating medium for the confirmation test for coli in water. It conforms to the requirements of the "Standard Methods" medium when prepared for laboratory use.

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